

=> FILE REG

FILE 'REGISTRY' ENTERED ON 15 NOV 2006

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

COPYRIGHT (C) 2006 American Chemical Society (ACS)

=> DISPLAY HISTORY FULL L1-

FILE 'HCAPLUS' ENTERED ON 15 NOV 2006

L1 360 SEA AMINE ?/AU

L2 25 SEA BELHAROUAK ?/AU

L3 15 SEA L1 AND L2

FILE 'REGISTRY' ENTERED ON 15 NOV 2006

L4 43 SEA (106-97-8/BI OR 106-98-9/BI OR 106-99-0/BI OR
108-88-3/BI OR 115-07-1/BI OR 115-11-7/BI OR 1201

L5 2 SEA L4 AND C/ELS AND 1/ELC.SUB

L6 15 SEA L4 AND (C(L)H)/ELS AND 2/ELC.SUB

FILE 'HCA' ENTERED ON 15 NOV 2006

L7 743012 SEA L5 OR GRAPHIT? OR CARBONACEOUS? OR CARBONIFEROUS? OR
(CARBON# OR C) (2A) (CONTAIN? OR CONTG# OR MATERIAL? OR
SOURC?)

L8 855120 SEA L6 OR CH4 OR METHANE# OR (NAT# OR NATURAL#) (2A) GAS##
OR C2H6 OR ETHANE# OR C3H8 OR PROPANE# OR C2H2 OR
ACETYLENE# OR ETHYNE# OR C4H10 OR BUTANE# OR ISOBUTANE#
OR BUTADIENE# OR BUTENE# OR ISOBUTYLENE#
E COATINGS/CV

L9 43471 SEA "COATING(S)"/CV OR COATINGS/CV
E COATING MATERIALS/CV

L10 284445 SEA "COATING MATERIALS"/CV
E COATING PROCESS/CV

L11 133097 SEA "COATING PROCESS"/CV

FILE 'LCA' ENTERED ON 15 NOV 2006

L12 7651 SEA (FILM? OR THINFILM? OR LAYER? OR OVERLAY? OR
OVERLAID? OR LAMIN? OR LAMEL? OR SHEET? OR LEAF? OR
FOIL? OR COAT? OR TOPCOAT? OR OVERCOAT? OR VENEER? OR
SHEATH? OR COVER? OR ENVELOP? OR ENCAS? OR ENWRAP? OR
OVERSPREAD?)/BI,AB

L13 201 SEA (L5 OR CARBON# OR CARBONACEOUS? OR CARBONIFEROUS? OR
C OR GRAPHIT?) (2A) (FILM? OR THINFILM? OR LAYER? OR
OVERLAY? OR OVERLAID? OR LAMIN? OR LAMEL? OR SHEET? OR
CLAD? OR COAT? OR TOPCOAT? OR OVERCOAT? OR VENEER? OR
SHEATH? OR COVER? OR ENVELOP? OR ENCAS? OR ENWRAP? OR
OVERSPREAD?)

L14 1 SEA (L5 OR CARBON# OR CARBONACEOUS? OR CARBONIFEROUS? OR

C OR GRAPHIT?) (2A) (CASING# OR JACKET? OR CAPSULAT? OR
ENCAPSUL? OR WRAPPING# OR ENSHEATH?)

FILE 'HCA' ENTERED ON 15 NOV 2006

L15 128298 SEA L13 OR L14 OR CARBON# (2A) LAYER?
L16 228624 SEA BATTERY OR BATTERIES OR (ELECTROCHEM? OR ELECTROLY?
OR GALVANI? OR WET OR DRY OR PRIMARY OR SECONDARY) (2A) (CE
LL OR CELLS) OR WETCELL? OR DRYCELL?

FILE 'REGISTRY' ENTERED ON 15 NOV 2006

L17 855 SEA (LI (L) FE (L) P (L) O)/ELS
L18 310 SEA L17 (L) (MN OR CO OR TI OR NI)/ELS
L19 52 SEA L17 (L) 4/ELC.SUB
L20 128 SEA L18 (L) 5/ELC.SUB

FILE 'HCA' ENTERED ON 15 NOV 2006

L21 56 SEA L19
L22 154 SEA L20
L23 128 SEA (L21 OR L22) AND L16
L24 QUE CATHOD## OR ANOD## OR ELECTROD##
L25 124 SEA (L21 OR L22) AND L24
L26 319714 SEA FURNAC? OR OVEN? OR KILN?
L27 64867 SEA FLUID? (2A) (BED OR BEDS OR BEDDED OR BEDDING# OR
SUPPORT?)
L28 45 SEA (L23 OR L25) AND L7
L29 6 SEA (L23 OR L25) AND L8
L30 4 SEA (L23 OR L25) AND (L9 OR L10 OR L11)
L31 7 SEA (L23 OR L25) AND L15
L32 3 SEA (L23 OR L25) AND L26
L33 1 SEA (L23 OR L25) AND L27
L34 16 SEA L29 OR L30 OR L31 OR L32 OR L33
L35 34 SEA L28 NOT L34
L36 8 SEA L34 AND 1840-2002/PY, PRY
L37 22 SEA L35 AND 1840-2002/PY, PRY

=> FILE HCA

FILE 'HCA' ENTERED ON 15 NOV 2006

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

COPYRIGHT (C) 2006 AMERICAN CHEMICAL SOCIETY (ACS)

=> D L36 1-8 CBIB ABS HITSTR HITIND

L36 ANSWER 1 OF 8 HCA COPYRIGHT 2006 ACS on STN

141:143280 **Cathode** material for lithium ion **batteries**

. Belharouak, Ilias; Amine, Khalil (USA). U.S. Pat. Appl. Publ. US 2004157126 A1 20040812, 20 pp. (English). CODEN: USXXCO.
APPLICATION: US 2003-612439 20030701. PRIORITY: US 2002-423953P
20021104; US 2003-463696P 20030416.

AB A method for coating an active material with carbon to form an **electrode** material is disclosed, comprising: exposing olivine or Nasicon to a carbon source gas in a **furnace**; and heating the carbon source gas to deposit carbon thereon. The carbon source gas, which may be mixed with an inert gas, generally decomps. between 100° and 1300° to generate carbon material. The amt. of **coated carbon** on the olivine or Nasicon is preferably <15 wt%, and more preferably about 4 wt% or less. Also disclosed is a **battery** comprising: a pos. **electrode** comprising the inventive **electrode** material; a neg. **electrode**; and an electrolyte.

IT **74-82-8, Methane**, processes **74-84-0, Ethane**, processes **74-85-1, Ethylene**, processes **74-86-2, Acetylene**, processes **74-98-6, Propane**, processes **75-28-5, Isobutane 106-97-8, Butane**, processes **106-98-9, 1-Butene**, processes **106-99-0, 1,3-Butadiene**, processes **108-88-3, Toluene**, processes **115-07-1, Propylene**, processes **115-11-7, Isobutylene**, processes **463-82-1, 2-2-Dimethylpropane 590-18-1, cis-2-Butene 624-64-6, trans-2-Butene**
(C source gas; **cathode** material for lithium ion **batteries**)

RN 74-82-8 HCA

CN Methane (8CI, 9CI) (CA INDEX NAME)

CH₄

RN 74-84-0 HCA

CN Ethane (8CI, 9CI) (CA INDEX NAME)

H₃C-CH₃

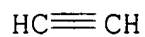
RN 74-85-1 HCA

CN Ethene (9CI) (CA INDEX NAME)

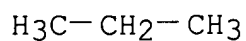
H₂C=CH₂

RN 74-86-2 HCA

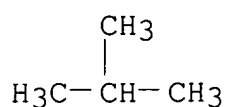
CN Ethyne (9CI) (CA INDEX NAME)



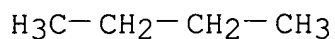
RN 74-98-6 HCA
CN Propane (8CI, 9CI) (CA INDEX NAME)



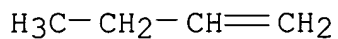
RN 75-28-5 HCA
CN Propane, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



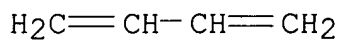
RN 106-97-8 HCA
CN Butane (8CI, 9CI) (CA INDEX NAME)



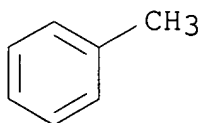
RN 106-98-9 HCA
CN 1-Butene (8CI, 9CI) (CA INDEX NAME)



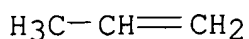
RN 106-99-0 HCA
CN 1,3-Butadiene (8CI, 9CI) (CA INDEX NAME)



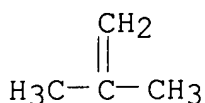
RN 108-88-3 HCA
CN Benzene, methyl- (9CI) (CA INDEX NAME)



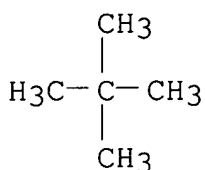
RN 115-07-1 HCA
CN 1-Propene (9CI) (CA INDEX NAME)



RN 115-11-7 HCA
CN 1-Propene, 2-methyl- (9CI) (CA INDEX NAME)

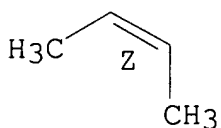


RN 463-82-1 HCA
CN Propane, 2,2-dimethyl- (8CI, 9CI) (CA INDEX NAME)



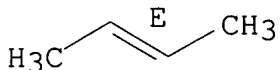
RN 590-18-1 HCA
CN 2-Butene, (2Z)- (9CI) (CA INDEX NAME)

Double bond geometry as shown.



RN 624-64-6 HCA
CN 2-Butene, (2E)- (9CI) (CA INDEX NAME)

Double bond geometry as shown.



IT **19414-36-9**, Iron lithium manganese phosphate
((Fe,Mn)Li(PO₄)) **727652-57-5**, Iron lithium titanium
phosphate ((Fe,Ti)Li(PO₄)) **727652-58-6**, Cobalt iron
lithium phosphate ((Co,Fe)Li(PO₄)) **727652-59-7**, Iron
lithium nickel phosphate ((Fe,Ni)Li(PO₄))
(**cathode** material for lithium ion **batteries**)

RN 19414-36-9 HCA

CN Iron lithium manganese phosphate ((Fe,Mn)Li(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mn	0 - 1	7439-96-5
Li	1	7439-93-2
Fe	0 - 1	7439-89-6

RN 727652-57-5 HCA

CN Iron lithium titanium phosphate ((Fe,Ti)Li(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Ti	0 - 1	7440-32-6
Li	1	7439-93-2
Fe	0 - 1	7439-89-6

RN 727652-58-6 HCA

CN Cobalt iron lithium phosphate ((Co,Fe)Li(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Co	0 - 1	7440-48-4
Li	1	7439-93-2
Fe	0 - 1	7439-89-6

RN 727652-59-7 HCA

CN Iron lithium nickel phosphate ((Fe,Ni)Li(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Ni	0 - 1	7440-02-0
Li	1	7439-93-2
Fe	0 - 1	7439-89-6

IC ICM H01M004-58
 ICS B05D005-12
 INCL 429231800; 427122000
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST **cathode** material lithium ion **battery**
 IT **Coating materials**
 (carbon; **cathode** material for lithium ion
batteries)
 IT **Battery cathodes**
 (**cathode** material for lithium ion **batteries**)
 IT Alloys, uses
 (**cathode** material for lithium ion **batteries**)
 IT Carbonaceous materials (technological products)
 (**cathode** material for lithium ion **batteries**)
 IT Noble gases, uses
 Olivine-group minerals
 (**cathode** material for lithium ion **batteries**)
 IT **Furnaces**
 (**fluidized-bed**; **cathode** material
 for lithium ion **batteries**)
 IT **Fluidized beds**
 (**furnaces**; **cathode** material for lithium ion
batteries)
 IT Secondary **batteries**
 (lithium; **cathode** material for lithium ion
batteries)
 IT **Furnaces**
 (rotary **furnaces**; **cathode** material for
 lithium ion **batteries**)
 IT **Furnaces**
 (static; **cathode** material for lithium ion
batteries)
 IT 74-82-8, Methane, processes 74-84-0,
Ethane, processes 74-85-1, Ethylene, processes
 74-86-2, **Acetylene**, processes 74-98-6,
Propane, processes 75-28-5, **Isobutane**
 106-97-8, **Butane**, processes 106-98-9, 1-
Butene, processes 106-99-0, 1,3-**Butadiene**
 , processes 108-88-3, Toluene, processes 115-07-1
 , Propylene, processes 115-11-7, **Isobutylene**,
 processes 463-82-1, 2-2-Dimethylpropane 590-18-1
 , cis-2-**Butene** 624-64-6, trans-2-**Butene**
 (C source gas; **cathode** material for lithium ion
batteries)
 IT 917-54-4, Lithium methide 7439-93-2, Lithium, uses 7440-44-0,
 Carbon, uses 7631-86-9, Silica, uses 7782-42-5, Graphite, uses
 7791-03-9, Lithium perchlorate 12019-69-1 12031-95-7, Lithium
 titanium oxide 114ti5o12 12032-82-5 12054-21-6 12135-01-2,

Lithium imide 13537-32-1D, Fluorophosphoric acid, alkyl lithium deriv. 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 90076-65-6 132404-42-3 132843-44-8

(**cathode** material for lithium ion **batteries**)

IT 7440-37-1, Argon, uses 7440-59-7, Helium, uses 7727-37-9, Nitrogen, uses **19414-36-9**, Iron lithium manganese phosphate ((Fe,Mn)Li(PO₄)) 77641-62-4, Nasicon **727652-57-5**, Iron lithium titanium phosphate ((Fe,Ti)Li(PO₄)) **727652-58-6**, Cobalt iron lithium phosphate ((Co,Fe)Li(PO₄)) **727652-59-7**, Iron lithium nickel phosphate ((Fe,Ni)Li(PO₄))

(**cathode** material for lithium ion **batteries**)

IT 7429-90-5, Aluminum, uses
(current collector; **cathode** material for lithium ion **batteries**)

L36 ANSWER 2 OF 8 HCA COPYRIGHT 2006 ACS on STN

141:108415 Method for preparing iron(II) lithium phosphate and its application in lithium ion **battery**. Zhou, Henghui; Chen, Jitao; Xu, Xiaoming (Beida Xianxing Science and Technology Industry Co., Ltd., Peop. Rep. China). Faming Zhuanli Shenqing Gongkai Shuomingshu CN 1401559 A 20030312, 9 pp. (Chinese). CODEN: CNXXEV. APPLICATION: CN 2002-146259 20021018.

AB LixFePO₄ is prepd. by mixing Li salt and Fe(II) salt with phosphate (at the Li-Fe-P mol. ratio of 0.97-1.2:1:1), milling for 1-2 h under adding suitable amt. of alc., placing in a pyrolysis **furnace**, heating to 100-500° at a heating rate of 1-20°/min under inert gas amt., heating for 1-30 h, milling again in the presence of alc. and carbon black, and treating at 500-900° for 10-48 h. The Li salt is Li₂CO₃, LiOH, Li₂C₂O₄, LiOAc, etc. The Fe(II) salt is FeC₂O₄, Fe(OAc)₂, FeCl₂, FeSO₄, Fe₃(PO₄)₂, etc. The phosphate is (NH₄)₃PO₄, (NH₄)₂HPO₄, NH₄H₂PO₄, Fe₃(PO₄)₂, etc. The Li+ **battery** consists of an **anode**, a **cathode**, electrolyte, and a diaphragm. The **anode** is composed of LixFePO₄ 74-99.4, conducting agent 0.5-16, and bonder 0.1-10%. The conducting agent is graphite and/or C black. The bonder is polytetrafluoroethylene, poly(vinylidene difluoride), or **butadiene**-styrene latex deriv. The electrolyte is 1M Li salt/org. solvent soln., Li salt is LiClO₄ or LiPF₆, and org. solvent is ethylene carbonate, di-Et carbonate, and/or di-Me carbonate. The diaphragm is polypropylene microporous thin film or polypropylene/polyethylene composite film.

IT **663602-74-2P**, Iron lithium phosphate (FeLi_{1.05}(PO₄))
681153-62-8P, Iron lithium phosphate (FeLi_{0.97}(PO₄))
(method for prepg. iron(II) lithium phosphate and its application in lithium ion **battery**)

RN 663602-74-2 HCA

CN Iron lithium phosphate (FeLi1.05(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O4P	1	14265-44-2
Li	1.05	7439-93-2
Fe	1	7439-89-6

RN 681153-62-8 HCA

CN Iron lithium phosphate (FeLi0.97(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O4P	1	14265-44-2
Li	0.97	7439-93-2
Fe	1	7439-89-6

IC ICM C01B025-26

ICS C01D015-00; H01M004-58

CC 49-5 (Industrial Inorganic Chemicals)

Section cross-reference(s): 52

ST lithium ferrous phosphate prepn **battery**

IT Secondary **batteries**

(lithium ion; method for prepg. iron(II) lithium phosphate and its application in lithium ion **battery**)

IT Fluoropolymers, processes

(method for prepg. iron(II) lithium phosphate and its application in lithium ion **battery**)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate
616-38-6, Dimethyl carbonate 7722-76-1, Ammonium phosphate
7782-42-5, Graphite, processes 7783-28-0, Diammonium hydrogen
phosphate 7791-03-9, Lithium perchlorate 9002-84-0,
Polytetrafluoroethylene 9002-88-4, Polyethylene 9003-07-0,
Polypropylene 9003-55-8, **Butadiene**-styrene copolymer
21324-40-3, Lithium hexafluorophosphate 24937-79-9,
Poly(vinylidene difluoride)

(method for prepg. iron(II) lithium phosphate and its application in lithium ion **battery**)

IT **663602-74-2P**, Iron lithium phosphate (FeLi1.05(PO4))

681153-62-8P, Iron lithium phosphate (FeLi0.97(PO4))

(method for prepg. iron(II) lithium phosphate and its application in lithium ion **battery**)

IT 516-03-0, Ferrous oxalate 546-89-4, Lithium acetate 553-91-3,
Lithium oxalate 554-13-2, Lithium carbonate 1310-65-2, Lithium
hydroxide 3094-87-9, Ferrous acetate 7720-78-7, Ferrous sulfate
14940-41-1, Ferrous phosphate

(method for prepg. iron(II) lithium phosphate and its application in lithium ion **battery**)

L36 ANSWER 3 OF 8 HCA COPYRIGHT 2006 ACS on STN

139:310059 Manufacture of fine ferrous phosphate hydrate crystals and lithium iron phosphorous oxides for secondary lithium **battery cathode** active materials. Kinoshita, Masayuki; Nakaoka, Yasuhiro; Yamazaki, Nobuyuki; Negishi, Katsuyuki (Nippon Chemical Industrial Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003292307 A2 20031015, 12 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-379425 20021227. PRIORITY: JP 2002-23934 20020131.

AB $\text{Fe}_3(\text{PO}_4)_2 \cdot 2.8\text{H}_2\text{O}$ (I), having av. particle size of $\leq 5 \mu\text{m}$, is manufd. by treatment of alkalis with aq. solns. contg. ferrous salts and H_3PO_4 . Lithium iron phosphorus oxides are manufd. by firing (A) I, lithium phosphate (II), and conductive carbonaceous materials or (B) I, II, conductive carbonaceous materials, and ≥ 1 metal compds. contg. elements chosen from Mn, Co, Ni, and Al, in the process I has high reactivity arising from particle fineness. Secondary Li **batteries** employing the oxides show high discharge capacity.

IT **610316-49-9P**, Cobalt iron lithium phosphorus oxide
610316-50-2P, Iron lithium nickel phosphorus oxide
 (manuf. of fine ferrous phosphate hydrate crystals and lithium iron phosphorous oxides for secondary lithium **battery cathode** active materials)

RN 610316-49-9 HCA

CN Cobalt iron lithium phosphorus oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+	=====+	=====+
O	x	17778-80-2
P	x	7723-14-0
Co	x	7440-48-4
Li	x	7439-93-2
Fe	x	7439-89-6

RN 610316-50-2 HCA

CN Iron lithium nickel phosphorus oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+	=====+	=====+
O	x	17778-80-2
P	x	7723-14-0
Ni	x	7440-02-0
Li	x	7439-93-2

Fe		x		7439-89-6
----	--	---	--	-----------

IC ICM C01B025-37
 ICS H01M004-58
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 49
 ST lithium iron phosphorus oxide **battery cathode**;
 ferrous phosphate hydrate fine crystal manuf
 IT Carbon black, uses
 (ECP, elec. conductive coatings on lithium iron phosphorus
 oxides, **cathode** active materials; manuf. of fine
 ferrous phosphate hydrate crystals and lithium iron phosphorous
 oxides for secondary lithium **battery cathode**
 active materials)
 IT Electric conductors
 (**carbonaceous, coatings** on lithium iron
 phosphorus-based oxides; manuf. of fine ferrous phosphate hydrate
 crystals and lithium iron phosphorous oxides for secondary
 lithium **battery cathode** active materials)
 IT Carbonaceous materials (technological products)
 (elec. conductive coatings on lithium iron phosphorus-based
 oxides; manuf. of fine ferrous phosphate hydrate crystals and
 lithium iron phosphorous oxides for secondary lithium
battery cathode active materials)
 IT **Battery cathodes**
 (secondary; manuf. of fine ferrous phosphate hydrate crystals and
 lithium iron phosphorous oxides for secondary lithium
battery cathode active materials)
 IT 15365-14-7P, Iron lithium phosphate (LiFePO_4) 485386-79-6P
 (manuf. of fine ferrous phosphate hydrate crystals and lithium
 iron phosphorous oxides for secondary lithium **battery**
cathode active materials)
 IT 10028-23-6P, Ferrous phosphate octahydrate 14154-09-7P, Manganese
 phosphate [$\text{Mn}_3(\text{PO}_4)_2$]
 (manuf. of fine ferrous phosphate hydrate crystals and lithium
 iron phosphorous oxides for secondary lithium **battery**
cathode active materials)
 IT **610316-49-9P**, Cobalt iron lithium phosphorus oxide
610316-50-2P, Iron lithium nickel phosphorus oxide
 610316-51-3P, Aluminum iron lithium phosphorus oxide
 (manuf. of fine ferrous phosphate hydrate crystals and lithium
 iron phosphorous oxides for secondary lithium **battery**
cathode active materials)
 IT 7664-38-2, Phosphoric acid, reactions 7782-63-0, Ferrous sulfate
 heptahydrate 10377-52-3, Lithium phosphate
 (manuf. of fine ferrous phosphate hydrate crystals and lithium
 iron phosphorous oxides for secondary lithium **battery**
cathode active materials)

IT 1310-73-2, Sodium hydroxide, reactions
(manuf. of fine ferrous phosphate hydrate crystals and lithium
iron phosphorous oxides for secondary lithium **battery**
cathode active materials)

L36 ANSWER 4 OF 8 HCA COPYRIGHT 2006 ACS on STN

138:404345 **Battery** structures, self-organizing structures and
related methods. Chiang, Yet Ming; Moorehead, William Douglas;
Gozdz, Antoni S.; Holman, Richard K.; Loxley, Andrew; Riley, Gilbert
N.; Viola, Michael S. (Al23systems, Inc., USA). U.S. Pat. Appl.
Publ. US 2003099884 A1 20030529, 70 pp., Cont.-in-part of U.S. Ser.
No. 21,740. (English). CODEN: USXXCO. APPLICATION: US 2002-206662
20020726. PRIORITY: US 2001-308360P 20010727; US 2001-21740
20011022.

AB An energy storage device includes a first **electrode**
comprising a first material and a second **electrode**
comprising a second material, at least a portion of the first and
second materials forming an interpenetrating network when dispersed
in an electrolyte, the electrolyte, the first material and the
second material are selected so that the first and second materials
exert a repelling force on each other when combined. An
electrochem. device, includes a first **electrode** in elec.
communication with a first current collector; a second
electrode in elec. communication with a second current
collector; and an ionically conductive medium in ionic contact with
the first and second **electrodes**, wherein at least a
portion of the first and second **electrodes** form an
interpenetrating network and wherein at least one of the first and
second **electrodes** comprises an **electrode**
structure providing two or more pathways to its current collector.

IT **531493-25-1**, Iron lithium titanium phosphate
(Fe_{0.98}LiTi_{0.02}(PO₄))

(**battery** structures, self-organizing structures and
related methods)

RN 531493-25-1 HCA

CN Iron lithium titanium phosphate (Fe_{0.98}LiTi_{0.02}(PO₄)) (9CI) (CA
INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Ti	0.02	7440-32-6
Li	1	7439-93-2
Fe	0.98	7439-89-6

IC ICM H01M004-64

ICS H01M004-80; H01M004-58

INCL 429233000; 429235000; 429231950; 429212000; 429231400; 429210000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST **battery** self organizing structure
IT **Battery anodes**
 Battery cathodes
 Coating process
 Embossing
 (**battery** structures, self-organizing structures and
 related methods)
IT Fluoropolymers, uses
 Glass, uses
 Polyamines
 Polyimides, uses
 Polyoxyalkylenes, uses
 (**battery** structures, self-organizing structures and
 related methods)
IT Polymers, uses
 (block, Li salt-doped; **battery** structures,
 self-organizing structures and related methods)
IT Primary **batteries**
 (lithium; **battery** structures, self-organizing
 structures and related methods)
IT Intercalation compounds
 (lithium; **battery** structures, self-organizing
 structures and related methods)
IT Azines
 Group VA element compounds
 (phosphazines; **battery** structures, self-organizing
 structures and related methods)
IT 7439-95-4, Magnesium, uses
 (CoLiO₂ doped with; **battery** structures, self-organizing
 structures and related methods)
IT 7440-03-1, Niobium, uses 7440-25-7, Tantalum, uses 7440-32-6,
 Titanium, uses 7440-33-7, Tungsten, uses 12042-37-4, AlLi
 (LiFePO₄ doped with; **battery** structures,
 self-organizing structures and related methods)
IT 7429-90-5, Aluminum, uses
 (LiMnO₂ doped with; **battery** structures, self-organizing
 structures and related methods)
IT 68-12-2, Dmf, uses 75-11-6, Diiodomethane 96-49-1, Ethylene
 carbonate 105-58-8, DiEthyl carbonate 108-32-7, Propylene
 carbonate 616-38-6, DimEthyl carbonate 627-31-6,
 1,3-Diiodopropane 1307-96-6, Cobalt monoxide, uses 1313-13-9,
 Manganese dioxide, uses 1313-99-1, Nickel oxide (NiO), uses
 1314-62-1, Vanadia, uses 1317-34-6, Manganese oxide mn₂o₃
 1317-35-7, Manganese oxide mn₃o₄ 1335-25-7, Lead oxide
 1343-98-2, Silicon hydroxide 1344-43-0, Manganese oxide mno, uses
 1345-25-1, Iron oxide feo, uses 7226-23-5 7439-93-2, Lithium,

uses 7439-93-2D, Lithium, intercalation compd. 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-36-0, Antimony, uses 7440-42-8, Boron, uses 7440-44-0, Carbon, uses 7440-56-4, Germanium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7631-86-9, Silicon oxide, uses 7782-42-5, Graphite, uses 9003-53-6, Polystyrene 10043-35-3, Boric acid (H₃BO₃), uses 10361-43-0, Bismuth hydroxide 12002-78-7 12031-65-1, Lithium nickel oxide linio₂ 12037-30-8, Vanadium oxide v6o11 12048-27-0, Bili 12057-17-9, Lithium manganese oxide limn₂o₄ 12057-22-6, LiZn 12057-30-6 12057-33-9 12063-07-9, Iron lithium oxide fe₂lio₄ 12162-79-7, Lithium manganese oxide limno₂ 12190-79-3, Cobalt lithium oxide colio₂ 12253-44-0 12338-02-2 12651-23-9, Titanium hydroxide 13463-67-7, Titanium oxide, uses 14475-63-9, Zirconium hydroxide Zr(OH)₄ 15365-14-7, Iron lithium phosphate felipo₄ 18282-10-5, Tin dioxide 21651-19-4, Tin oxide sno 24937-79-9, Polyvinylidene fluoride 25014-41-9, Polyacrylonitrile 25322-68-3, Peo 25322-69-4, Polypropylene oxide 37217-08-6, Lithium titanium oxide liti₂o₄ 39345-91-0, Lead hydroxide 53262-48-9 55575-96-7, Lithium silicide Lil₃Si₄ 55608-41-8 56627-44-2 61812-08-6, Lithium silicide Li₂Si₈ 66403-10-9, Lithium boride Li₅B₄ 67070-82-0 71012-86-7, Lithium boride Li₇B₆ 74083-26-4 76036-33-4, Lithium silicide Lil₂Si₇ 106494-93-3, Lithium silicide Li₂Si₅ 114778-10-8, Iron lithium sulfate Fe₂Li₂(SO₄)₃ 144419-56-7, Cobalt lithium magnesium oxide Co_{0.95}LiMg_{0.05}O₂ 496816-56-9 496816-58-1, Iron lithium zirconium phosphate Fe_{0.98}LiZr_{0.02}(PO₄) **531493-25-1**, Iron lithium titanium phosphate (Fe_{0.98}LiTi_{0.02}(PO₄))

(**battery** structures, self-organizing structures and related methods)

IT 99742-70-8, Poly(o-methoxyaniline) 104934-51-2, Poly(3-octylthiophene)

(**battery** structures, self-organizing structures and related methods)

IT 1303-86-2, Boron oxide (B₂O₃), uses 1304-76-3, Bismuth oxide (Bi₂O₃), uses 1314-23-4, Zirconium oxide, uses 1314-56-3, Phosphorus oxide (P₂O₅), uses 1317-36-8, Lead oxide (PbO), uses 7447-41-8, Lithium chloride, uses 7789-24-4, Lithium fluoride, uses 10377-51-2, Lithium iodide 12057-24-8, Lithia, uses

(glass; **battery** structures, self-organizing structures and related methods)

L36 ANSWER 5 OF 8 HCA COPYRIGHT 2006 ACS on STN

138:124985 secondary nonaqueous electrolyte **battery**. Miyaki, Yukio (Sony Corporation, Japan). PCT Int. Appl. WO 2003007405 A1 20030123, 25 pp. DESIGNATED STATES: W: CN, KR, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2002-JP7011 20020710.

PRIORITY: JP 2001-209727 20010710.

AB A secondary Li **battery** uses an **anode** contg. a carbonaceous material, a polymer, and a Sn compd. SnMxM'yM''z , where M = Co and/or Cu; M' = Cr, Fe, Mn, Nb, Mo, W, B, and/or P; M'' = In, Ag, Zn, and/or Al; $0.1 < x \leq 2$, $0 < y \leq 2$, and $0 < z \leq 1$.

IT **474902-99-3**, Iron lithium manganese phosphate ($\text{Fe}_{0.35}\text{LiMn}_{0.65}(\text{PO}_4)$)

(**cathodes** in secondary lithium **batteries** using tin alloy contg. carbonaceous **anodes**)

RN 474902-99-3 HCA

CN Iron lithium manganese phosphate ($\text{Fe}_{0.35}\text{LiMn}_{0.65}(\text{PO}_4)$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0.65	7439-96-5
Li	1	7439-93-2
Fe	0.35	7439-89-6

IC ICM H01M004-38

ICS H01M004-58; H01M004-62; H01M004-02; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary lithium **battery** carbonaceous **anode** tin alloy compn

IT **Battery anodes**

(carbonaceous **anodes** contg. tin alloys and polymers for secondary lithium **batteries**)

IT Fluoropolymers, uses

Styrene-**butadiene** rubber, uses

(carbonaceous **anodes** contg. tin alloys and polymers for secondary lithium **batteries**)

IT 24937-79-9, Poly(vinylidene fluoride)

(carbonaceous **anodes** contg. tin alloys and polymers for secondary lithium **batteries**)

IT 12190-79-3, Cobalt lithium oxide (CoLiO_2) 15365-14-7

253776-82-8, Aluminum cobalt lithium nickel oxide

($\text{Al}_{0.01}\text{Co}_{0.19}\text{LiNi}_{0.80}\text{O}_2$) **474902-99-3**, Iron lithium manganese phosphate ($\text{Fe}_{0.35}\text{LiMn}_{0.65}(\text{PO}_4)$)

(**cathodes** in secondary lithium **batteries**

using tin alloy contg. carbonaceous **anodes**)

IT 12787-61-0 70993-37-2 489428-73-1 489428-74-2 489428-75-3
 489428-76-4 489428-77-5 489428-78-6 489428-79-7 489428-80-0
 489428-81-1 489428-82-2 489428-83-3 489428-84-4 489428-85-5
 489428-86-6 489428-87-7 489428-88-8 489428-89-9

(compns. of tin alloys in carbonaceous **anodes** for

- secondary lithium **batteries**)
- IT 9003-55-8
(styrene-**butadiene** rubber, carbonaceous **anodes**
contg. tin alloys and polymers for secondary lithium
batteries)
- IT 7782-42-5, Graphite, uses
(synthetic; carbonaceous **anodes** contg. tin alloys and
polymers for secondary lithium **batteries**)

L36 ANSWER 6 OF 8 HCA COPYRIGHT 2006 ACS on STN

137:340029 Method of forming phosphate powder particle compositions with
complex anions for **electrodes** and **batteries**.

Chaloner-Gill, Benjamin; Pinoli, Allison A.; Horne, Craig R.; Mosso,
Ronald J.; Bi, Xiangxin (Neo Photonics Corporation, USA). PCT Int.
Appl. WO 2002089233 A2 **20021107**, 59 pp. DESIGNATED

STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE,
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL,
PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG,
US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW:
AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB,
GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR.

(English). CODEN: PIXXD2. APPLICATION: WO 2002-US12069 20020418.
PRIORITY: US 2001-845985 20010430.

- AB Nanoscale and submicron particles have been produced with polyat.
anions. The particles can be cryst. or amorphous. The particles
are synthesized in a flowing reactor, preferably with an intense
light beam driving the reaction. In preferred embodiments, the
particles are highly uniform. **Batteries** can be formed
from submicron and nanoscale lithium metal phosphates. Coatings
also can be formed from the particles.

- IT **474317-40-3P**, Iron lithium phosphate ($\text{FeLi}_{0.1-1}(\text{PO}_4)$)
474317-41-4P, Iron lithium manganese phosphate
($\text{Fe}_{0.2-1}\text{LiMn}_{0-0.8}(\text{PO}_4)$) **474317-42-5P**, Iron lithium
manganese phosphate ($\text{Fe}_{0.2-0.6}\text{LiMn}_{0.4-0.8}(\text{PO}_4)$)
(method of forming phosphate powder particle compns. with complex
anions for **electrodes** and **batteries**)

RN 474317-40-3 HCA

CN Iron lithium phosphate ($\text{FeLi}_{0.1-1}(\text{PO}_4)$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O4P	1	14265-44-2
Li	0.1 - 1	7439-93-2
Fe	1	7439-89-6

RN 474317-41-4 HCA
 CN Iron lithium manganese phosphate (Fe0.2-1LiMn0-0.8(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0 - 0.8	7439-96-5
Li	1	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 474317-42-5 HCA
 CN Iron lithium manganese phosphate (Fe0.2-0.6LiMn0.4-0.8(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0.4 - 0.8	7439-96-5
Li	1	7439-93-2
Fe	0.2 - 0.6	7439-89-6

IC ICM H01M004-40
 ICS H01M004-50; H01M004-52; A61K009-14
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 49
 ST **battery electrode** phosphate powder particle compn
 IT Secondary **batteries**
 (lithium; method of forming phosphate powder particle compns. with complex anions for **electrodes** and **batteries**)
 IT **Battery cathodes**
Coating materials
 IR lasers
 (method of forming phosphate powder particle compns. with complex anions for **electrodes** and **batteries**)
 IT Thermal decomposition
 (photo-; method of forming phosphate powder particle compns. with complex anions for **electrodes** and **batteries**)
 IT 554-13-2, Lithium carbonate 7783-28-0, DiAmmonium phosphate
 (method of forming phosphate powder particle compns. with complex anions for **electrodes** and **batteries**)
 IT 7439-93-2, Lithium, uses 7439-93-2D, Lithium, intercalation compd.
 (method of forming phosphate powder particle compns. with complex anions for **electrodes** and **batteries**)

- IT 10045-86-0P, Ferric phosphate 14940-41-1P, Ferrous phosphate
15365-14-7P **474317-40-3P**, Iron lithium phosphate
(FeLi_{0.1-1}(PO₄)) **474317-41-4P**, Iron lithium manganese
phosphate (Fe_{0.2-1}LiMn_{0-0.8}(PO₄)) **474317-42-5P**, Iron
lithium manganese phosphate (Fe_{0.2-0.6}LiMn_{0.4-0.8}(PO₄))
(method of forming phosphate powder particle compns. with complex
anions for **electrodes** and **batteries**)
- IT 7719-09-7, Thionyl chloride 7791-25-5, Sulfuryl chloride
10025-87-3, Phosphorus oxychloride 10026-04-7, Silicon
tetrachloride 12627-13-3, Silicate 14265-44-2, Phosphate,
processes 14808-79-8, Sulfate, processes 53116-81-7,
Tetramethylammonium silicate
(precursor; method of forming phosphate powder particle compns.
with complex anions for **electrodes** and
batteries)

L36 ANSWER 7 OF 8 HCA COPYRIGHT 2006 ACS on STN

136:297382 **Carbon-coated** or **carbon**

-crosslinked redox materials with transition metal-lithium oxide
core for use as **battery electrodes**. Armand,

Michel; Gauthier, Michel; Magnan, Jean-Francois; Ravet, Nathalie
(Hydro-Quebec, Can.). PCT Int. Appl. WO 2002027824 A1

20020404, 78 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT,

AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK,
DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS,
JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL,
TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG,
KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE,
DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE,
SN, TD, TG, TR. (French). CODEN: PIXXD2. APPLICATION: WO
2001-CA1350 20010921. PRIORITY: CA 2000-2320661 20000926.

- AB **Carbon-coated** redox materials suitable for use
in **battery electrodes** consist of a core
surrounded by a coating, or interconnected by carbon crosslinks, in
which the core includes a compn. of formula $\text{Li}_x\text{M}_1\text{-yM}'\text{y}(\text{XO}_4)_n$, in
which $y = 0-0.6$, $x = 0-2$, $n = 0-1.5$; M is a transition metal; and M'
is a element of fixed valence selected from Mg²⁺, Ca²⁺, Al³⁺, and
Zn²⁺, and X is S, P, and Si. Synthesis of the materials is carried
out by reacting a balanced mixt. of appropriate precursors in a
reducing atm., to adjust the valence of the transition metals, in
the presence of a carbon source, which is then pyrolyzed. The
resulting products exhibit an excellent elec. cond. and a highly
enhanced chem. activity.

- IT **213467-46-0**, Iron lithium manganese phosphate
(FeLi₂Mn(PO₄)₂)

(**electrodes** contg.; **carbon-coated**
or **carbon**-crosslinked redox materials with transition

metal-lithium oxide core for use as **battery electrodes)**

RN 213467-46-0 HCA

CN Iron lithium manganese phosphate ($\text{FeLi}_2\text{Mn}(\text{PO}_4)_2$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	2	14265-44-2
Mn	1	7439-96-5
Li	2	7439-93-2
Fe	1	7439-89-6

IT **407640-52-2**, Iron lithium manganese phosphate ($\text{Fe}_{0.1-1}\text{LiMn}_{0-0.9}(\text{PO}_4)$) **407640-59-9**, Iron lithium manganese phosphate ($(\text{Fe},\text{Mn})\text{Li}_{1-1.6}(\text{PO}_4)$) **407640-61-3**, Iron lithium titanium phosphate ($(\text{Fe},\text{Ti})\text{Li}_{0.5-2}(\text{PO}_4)_{1.5}$) (metal source; **carbon-coated** or **carbon-crosslinked** redox materials with transition metal-lithium oxide core for use as **battery electrodes)**

RN 407640-52-2 HCA

CN Iron lithium manganese phosphate ($\text{Fe}_{0.1-1}\text{LiMn}_{0-0.9}(\text{PO}_4)$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0 - 0.9	7439-96-5
Li	1	7439-93-2
Fe	0.1 - 1	7439-89-6

RN 407640-59-9 HCA

CN Iron lithium manganese phosphate ($(\text{Fe},\text{Mn})\text{Li}_{1-1.6}(\text{PO}_4)$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0 - 1	7439-96-5
Li	1 - 1.6	7439-93-2
Fe	0 - 1	7439-89-6

RN 407640-61-3 HCA

CN Iron lithium titanium phosphate ($(\text{Fe},\text{Ti})\text{Li}_{0.5-2}(\text{PO}_4)_{1.5}$) (9CI) (CA INDEX NAME)

INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1.5	14265-44-2
Ti	0 - 1	7440-32-6
Li	0.5 - 2	7439-93-2
Fe	0 - 1	7439-89-6
IC	ICM H01M004-48	
	ICS C01B025-37; C01B033-20; H01M004-58; H01M004-62; C01B017-96	
CC	52-2 (Electrochemical, Radiational, and Thermal Energy Technology)	
ST	carbon encapsulated redox material	
	battery electrode; cathode	
	battery carbon coated redox material	
IT	Silanes	
	(alkoxy, silicon source; carbon-coated or	
	carbon -crosslinked redox materials with transition	
	metal-lithium oxide core for use as battery	
	electrodes)	
IT	Polyoxyalkylenes, uses	
	(alkyl ethers, oligomeric, aprotic solvent; carbon-	
	coated or carbon -crosslinked redox materials	
	with transition metal-lithium oxide core for use as	
	battery electrodes)	
IT	Fluoropolymers, uses	
	Polyesters, uses	
	Polyethers, uses	
	(binders; carbon-coated or carbon	
	-crosslinked redox materials with transition metal-lithium oxide	
	core for use as battery electrodes)	
IT	Battery cathodes	
	Battery electrodes	
	Redox agents	
	(carbon-coated or carbon	
	-crosslinked redox materials with transition metal-lithium oxide	
	core for use as battery electrodes)	
IT	Transition metals, uses	
	(electrodes contg.; carbon-coated	
	or carbon -crosslinked redox materials with transition	
	metal-lithium oxide core for use as battery	
	electrodes)	
IT	78-93-3, Methyl ethyl ketone, uses 96-48-0, Butyrolactone	
	96-49-1, Ethylene carbonate 107-21-1D, Ethylene glycol, alkyl	
	ethers 108-32-7, Propylene carbonate 111-46-6D, Diethylene	
	glycol, alkyl ethers 112-27-6D, Triethylene glycol, alkyl ethers	
	112-60-7D, Tetraethylene glycol, alkyl ethers 463-79-6D, Carbonic	

- acid, C1-4-alkyl esters
(aprotic solvent; **carbon-coated** or
carbon-crosslinked redox materials with transition
metal-lithium oxide core for use as **battery
electrodes**)
- IT 9011-14-7, Poly(methyl methacrylate) 24937-79-9, Poly(vinylidene
difluoride) 25014-41-9, Polyacrylonitrile
(binders; **carbon-coated** or **carbon**
-crosslinked redox materials with transition metal-lithium oxide
core for use as **battery electrodes**)
- IT 50-99-7, Glucose, reactions 57-48-7, Fructose, reactions
57-50-1, Sucrose, reactions 58-86-6, Xylose, reactions 87-79-6,
Sorbitol 9002-88-4, Polyethylene 9003-07-0, Polypropylene
9004-34-6, Cellulose, reactions 9004-34-6D, Cellulose, esters
9004-35-7, Cellulose acetate 9005-25-8, Starch, reactions
25212-86-6, Poly(furfuryl alcohol) 43094-71-9, Ethylene-ethylene
oxide copolymer
(**carbon** source; **carbon-coated** or
carbon-crosslinked redox materials with transition
metal-lithium oxide core for use as **battery
electrodes**)
- IT 407640-63-5, Iron lithium titanium phosphate sulfate
($\text{Fe}_{0.85}\text{Li}_{1.35}\text{Ti}_{0.15}(\text{PO}_4)_0.5(\text{SO}_4)$)
(**electrodes** contg.; **carbon-coated**
or **carbon**-crosslinked redox materials with transition
metal-lithium oxide core for use as **battery
electrodes**)
- IT 7439-89-6D, Iron, mixed oxides 7439-96-5D, Manganese, mixed oxides
7440-02-0D, Nickel, mixed oxides 7440-32-6D, Titanium, mixed
oxides 7440-47-3D, Chromium, mixed oxides 7440-48-4D, Cobalt,
mixed oxides 7440-50-8D, Copper, mixed oxides 7440-62-2D,
Vanadium, mixed oxides 13816-45-0, Triphylite 15365-14-7, Iron
lithium phosphate (FeLiPO_4) **213467-46-0**, Iron lithium
manganese phosphate ($\text{FeLi}_2\text{Mn}(\text{PO}_4)_2$)
(**electrodes** contg.; **carbon-coated**
or **carbon**-crosslinked redox materials with transition
metal-lithium oxide core for use as **battery
electrodes**)
- IT 90076-65-6
(electrolyte contg.; **carbon-coated** or
carbon-crosslinked redox materials with transition
metal-lithium oxide core for use as **battery
electrodes**)
- IT 516-03-0, Ferrous oxalate
(iron source; **carbon-coated** or **carbon**
-crosslinked redox materials with transition metal-lithium oxide
core for use as **battery electrodes**)
- IT 7429-90-5, Aluminum, uses 7440-31-5, Tin, uses 7440-36-0,

Antimony, uses 7440-66-6, Zinc, uses 7782-42-5, Graphite, uses 39302-37-9, Lithium titanate 207803-50-7, Aluminum cobalt lithium magnesium nickel oxide 258511-24-9, Iron lithium nitride 263898-18-6, Cobalt manganese nitride 407640-62-4

(lithium-based **cathodes** contg.; **carbon-coated** or **carbon-crosslinked** redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 638-38-0, Manganese(II) acetate (manganese source; **carbon-coated** or **carbon-crosslinked** redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 546-89-4, Lithium acetate 553-91-3, Lithium oxalate 554-13-2, Lithium carbonate 1309-37-1, Ferric oxide, reactions 1310-65-2, Lithium hydroxide 1313-13-9, Manganese dioxide, reactions 1314-62-1, Vanadium pentoxide, reactions 1317-61-9, Magnetite, reactions 10045-86-0, Ferric phosphate 10102-24-6, Lithium silicate (Li₂SiO₃) 10377-48-7, Lithium sulfate 10377-52-3, Lithium phosphate (Li₃PO₄) 10421-48-4, Ferric nitrate 12057-24-8, Lithium oxide, reactions 12627-14-4 13453-80-0, Lithium dihydrogen phosphate 63985-45-5, Lithium orthosilicate **407640-52-2**, Iron lithium manganese phosphate (Fe_{0.1}-1LiMn_{0-0.9}(PO₄)) 407640-53-3, Iron lithium magnesium phosphate (Fe_{0.7}-1LiMg_{0-0.3}(PO₄)) 407640-54-4, Calcium iron lithium phosphate (Ca_{0-0.3}Fe_{0.7}-1Li(PO₄)) 407640-55-5 407640-56-6, Iron lithium phosphate silicate (FeLi_{1-1.9}(PO₄)_{0.1-1}(SiO₄)_{0-0.9}) 407640-57-7 407640-58-8, Iron lithium manganese phosphate sulfate (Fe₀₋₁Li_{1-1.2}Mn_{0-0.2}[(PO₄), (SO₄)]) **407640-59-9**, Iron lithium manganese phosphate ((Fe,Mn)Li_{1-1.6}(PO₄)) 407640-60-2, Iron lithium manganese phosphate sulfate (Fe₁₋₂Li₁₋₂Mn₀₋₁[(PO₄), (SO₄)]) **407640-61-3**, Iron lithium titanium phosphate ((Fe,Ti)Li_{0.5-2}(PO₄)_{1.5}) (metal source; **carbon-coated** or **carbon-crosslinked** redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 25322-68-3D, Polyethylene glycol, alkyl ethers (oligomeric, aprotic solvent; **carbon-coated** or **carbon-crosslinked** redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 7664-38-2, Phosphoric acid, reactions 7664-38-2D, Phosphoric acid, esters 7783-28-0, Ammonium hydrogen phosphate 10124-54-6, Manganese phosphate (phosphorus source; **carbon-coated** or **carbon-crosslinked** redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

- electrodes)**
- IT 7631-86-9, Silica, reactions
(silicon source; **carbon-coated** or
carbon-crosslinked redox materials with transition
metal-lithium oxide core for use as **battery**
electrodes)
- IT 7664-93-9, Sulfuric acid, reactions 7783-20-2, Ammonium sulfate,
reactions
(sulfur source; **carbon-coated** or
carbon-crosslinked redox materials with transition
metal-lithium oxide core for use as **battery**
electrodes)
- L36 ANSWER 8 OF 8 HCA COPYRIGHT 2006 ACS on STN
- 136:297381 Method for synthesis of **carbon-coated**
redox materials with controlled size. Armand, Michel; Gauhtier,
Michel; Magnan, Jean-Francois; Ravet, Nathalie (Hydro-Quebec, Can.).
PCT Int. Appl. WO 2002027823 A1 **20020404**, 83 pp.
DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR,
BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,
LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ,
PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA,
UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW:
AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB,
GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR.
(French). CODEN: PIXXD2. APPLICATION: WO 2001-CA1349 20010921.
PRIORITY: CA 2000-2320661 20000926.
- AB **Carbon-coated** redox materials suitable for use
as **battery electrodes** and for fabrication of
electrochromic materials, consist of compns. of formulas $C-LixM1-y$
(XO_4) n or $LixM1-yM'y$ (XO_4) n , in which: $y = 0-0.6$; $x = 0-2$; $n =$
 $1-1.5$; M is a transition metal or a mixt. of first-row transition
metals; M' is a fixed-valent metal ion selected from Mg^{2+} , Ca^{2+} ,
 Al^{3+} , or Zn^{2+} ; and X is S, P, and Si. The resulting materials
consist of particles coated with a conductive **carbon**
layer. The compns. are prepd. by reacting a balanced mixt.
of precursors in the appropriate proportions, including a pyrolysis
step for the carbon-producing compd.(s), such that the materials
form a powd. compn. with the desired formula, that has an elec.
cond. of $>10^{-8}$ S/cm when compacted at 3750 kg/cm².
- IT **7440-44-0, Carbon**, uses
(**coating, cathodes** contg.; synthesis of
carbon-coated redox materials for use as
battery cathodes and in electrochromic devices)
- RN 7440-44-0 HCA
- CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT **213467-46-0P**, Iron lithium manganese phosphate
(FeLi₂Mn(PO₄)₂)
(redox **cathode** contg.; synthesis of **carbon-coated** redox materials for use as **battery cathodes** and in electrochromic devices)

RN 213467-46-0 HCA

CN Iron lithium manganese phosphate (FeLi₂Mn(PO₄)₂) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	2	14265-44-2
Mn	1	7439-96-5
Li	2	7439-93-2
Fe	1	7439-89-6

IC ICM H01M004-48

ICS H01M004-58; H01M004-62; C01B025-37; C01B033-20

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72

ST **carbon encapsulated** redox material
battery electrode; electrochromic material
carbon coated redox particle size; **cathode**
battery carbon coated redox material

IT Fluoropolymers, uses
(binder; synthesis of **carbon-coated** redox
materials for use as **battery cathodes** and in
electrochromic devices)

IT **Battery cathodes**

Battery electrodes

Electrochromic materials

Redox agents

(synthesis of **carbon-coated** redox materials
for use as **battery cathodes** and in
electrochromic devices)

IT 24937-79-9, Poly(vinylidene difluoride)
(binder; synthesis of **carbon-coated** redox
materials for use as **battery cathodes** and in
electrochromic devices)

IT 9004-35-7, Cellulose acetate 43094-71-9, Ethylene-ethylene oxide
copolymer
(carbon source; synthesis of **carbon-coated**
redox materials for use as **battery cathodes**
and in electrochromic devices)

- IT 7440-44-0, Carbon, uses
(coating, cathodes contg.; synthesis of
carbon-coated redox materials for use as
battery cathodes and in electrochromic devices)
- IT 96-49-1, Ethylene carbonate 616-38-6, Dimethylcarbonate
7791-03-9, Lithium perchlorate 90076-65-6, Methanesulfonamide,
1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt
(electrolyte contg.; synthesis of carbon-coated
redox materials for use as battery cathodes
and in electrochromic devices)
- IT 554-13-2, Lithium carbonate
(reaction of; synthesis of carbon-coated
redox materials for use as battery cathodes
and in electrochromic devices)
- IT 13463-10-0, Ferric phosphate dihydrate
(redn. of; synthesis of carbon-coated redox
materials for use as battery cathodes and in
electrochromic devices)
- IT 7429-90-5P, Aluminum, uses 7439-95-4P, Magnesium, uses
7440-66-6P, Zinc, uses 7440-70-2P, Calcium, uses 13816-45-0P,
Triphylite 15365-14-7P, Iron lithium phosphate (FeLiPO₄)
213467-46-0P, Iron lithium manganese phosphate
(FeLi₂Mn(PO₄)₂)
(redox cathode contg.; synthesis of carbon-
coated redox materials for use as battery
cathodes and in electrochromic devices)

=> D L37 1-22 CBIB ABS HITSTR HITIND

L37 ANSWER 1 OF 22 HCA COPYRIGHT 2006 ACS on STN

140:184700 Secondary lithium battery and its cathode

. Tanjo, Yuji (Nissan Motor Co., Ltd., Japan). Jpn. Kokai Tokkyo
Koho JP 2004055328 A2 20040219, 12 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 2002-210958 20020719.

- AB The battery has ≥ 1 Li contg. multiple oxide
cathodes, ≥ 1 Li intercalating carbonaceous
anodes, separators between the cathodes and
anodes, and a Li⁺ conducting electrolyte soln.; where the
cathode active mass is a Li contg. multiple oxide, selected
from Li Mn oxide, Li Ni oxide, Li Co oxide, Li Fe P oxide, and Li Mn
P oxide and has av. particle diam. ≤ 1 μ m. Preferably, the
cathodes contain $\geq 20\%$ conductor and are 50-150 μ m
thick.
- IT 223571-46-8, Iron lithium phosphorus oxide
(fine lithium contg. multiple oxide particles with controlled
particle size for secondary lithium battery
cathodes)

RN 223571-46-8 HCA
CN Iron lithium phosphorus oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	x	17778-80-2
P	x	7723-14-0
Li	x	7439-93-2
Fe	x	7439-89-6

IC ICM H01M004-58
ICS H01M004-02; H01M004-62; H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST secondary lithium **battery** multiple oxide **cathode**
IT **Battery cathodes**
(lithium contg. multiple oxide **cathodes** with controlled
thickness and oxide particle size for secondary **batteries**
)
IT 12057-17-9, Lithium manganese oxide (LiMn2O4) 39300-70-4, Lithium
nickel oxide 52627-24-4, Cobalt lithium oxide 138758-08-4,
Lithium manganese phosphorus oxide **223571-46-8**, Iron
lithium phosphorus oxide
(fine lithium contg. multiple oxide particles with controlled
particle size for secondary lithium **battery**
cathodes)

L37 ANSWER 2 OF 22 HCA COPYRIGHT 2006 ACS on STN
139:383994 Production method of **cathode** material containing
lithium iron phosphate compound and conductive particles and
secondary **battery** with high discharge capacity. Higuchi,
Shoji (Kansai Research Institute Inc., Japan). Jpn. Kokai Tokkyo
Koho JP 2003323894 A2 20031114, 5 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 2002-130334 20020502.
AB **Battery cathode** material contg.
LiFe(1-w-x-y-z)MnwNixZnyCozPO4 (0≤w≤1; 0≤x<1,
0≤y<1, 0≤z<1; 0<w+x+y+z<1) and conductive particles is
manufd. by mixing a Li compd., a bivalent metal compd. (e.g., Fe,
Mn, Ni, Zn, Co), and phosphate together with a polar solvent and
inert gas in an airtight container under sealing and reacting at
100-250°, wherein conductive particles are mixed in the
reaction soln. The conductive particles are preferably metal, C
isotope, or conductive polymer. The **cathode** material is
used as **cathode** for secondary **battery**.
IT **7440-44-0**, Carbon, uses
(isotope; prodn. method of **cathode** material contg.
lithium iron phosphate compd. and conductive particles and
secondary **battery** with high discharge capacity)

RN 7440-44-0 HCA
 CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT **331622-63-0**, Cobalt iron lithium phosphate
 (Co_{0.2}Fe_{0.8}Li(PO₄))
 (prodn. method of **cathode** material contg. lithium iron
 phosphate compd. and conductive particles and secondary
battery with high discharge capacity)
 RN 331622-63-0 HCA
 CN Cobalt iron lithium phosphate (Co_{0.2}Fe_{0.8}Li(PO₄)) (9CI) (CA INDEX
 NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Co	0.2	7440-48-4
Li	1	7439-93-2
Fe	0.8	7439-89-6

IC ICM H01M004-58
 ICS C01B025-45; H01M004-04; H01M004-62; H01M010-40
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST conducting particle iron lithium phosphate compd **battery**
cathode
 IT **Battery cathodes**
 Conducting polymers
 (prodn. method of **cathode** material contg. lithium iron
 phosphate compd. and conductive particles and secondary
battery with high discharge capacity)
 IT Carbon black, uses
 Metals, uses
 Polyanilines
 (prodn. method of **cathode** material contg. lithium iron
 phosphate compd. and conductive particles and secondary
battery with high discharge capacity)
 IT **7440-44-0**, Carbon, uses
 (isotope; prodn. method of **cathode** material contg.
 lithium iron phosphate compd. and conductive particles and
 secondary **battery** with high discharge capacity)
 IT 7440-22-4, Silver, uses **331622-63-0**, Cobalt iron lithium
 phosphate (Co_{0.2}Fe_{0.8}Li(PO₄)) 331622-65-2, Iron lithium zinc
 phosphate (Fe_{0.8}LiZn_{0.2}(PO₄)) 622872-62-2, Iron lithium manganese
 nickel phosphate (Fe_{0.8}LiMn_{0.1}Ni_{0.1}(PO₄))
 (prodn. method of **cathode** material contg. lithium iron

phosphate compd. and conductive particles and secondary
battery with high discharge capacity)

L37 ANSWER 3 OF 22 HCA COPYRIGHT 2006 ACS on STN

138:290280 X-Ray Absorption Study of $\text{Li}_x\text{Mn}_y\text{Fe}_{1-x-y}\text{PO}_4$ ($0 \leq x \leq 1$, $0 < y \leq 1$). Li, Guohua; Kudo, Yoshihiro; Liu, Kuang-Yu; Azuma, Hideto; Tohda, Masayuki (Sony Corporation, Nishi Battery Laboratories, Kanagawa, 243-0021, Japan). Journal of the Electrochemical Society, 149(11), A1414-A1418 (English) **2002**. CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.

AB **C-contg. cathode materials**

$\text{LiMn}_y\text{Fe}_{1-y}\text{PO}_4$ ($0 < y \leq 1$) were prepd. by a solid-state reaction by adding C black to the synthetic precursors. The local structural change of electrochem. prepd. $\text{Li}_x\text{Mn}_y\text{Fe}_{1-x-y}\text{PO}_4$ ($0 \leq x \leq 1$, $0 < y \leq 1$) samples was studied by x-ray absorption spectroscopy. The local structural change of Mn is completely reversible during the charge-discharge processes. According to the anal. of K-edge x-ray absorption fine structure, no significant difference is obsd. in the local structure of Mn in the charged state for the whole range of Mn contents.

IT **213467-46-0**, Iron lithium manganese phosphate ($\text{FeLi}_2\text{Mn}(\text{PO}_4)_2$) **412351-36-1**, Iron lithium manganese phosphate ($\text{Fe}_{0.9}\text{LiMn}_{0.1}(\text{PO}_4)$) **464174-82-1**, Iron lithium manganese phosphate ($(\text{Fe},\text{Mn})\text{Li}_{0.1}(\text{PO}_4)$) **474903-00-9**, Iron lithium manganese phosphate ($\text{Fe}_{0.3}\text{LiMn}_{0.7}(\text{PO}_4)$) **474903-03-2**, Iron lithium manganese phosphate ($\text{Fe}_{0.1}\text{LiMn}_{0.9}(\text{PO}_4)$) (x-ray absorption spectroscopy of iron lithium manganese phosphate **cathodes** for lithium **batteries**)

RN 213467-46-0 HCA

CN Iron lithium manganese phosphate ($\text{FeLi}_2\text{Mn}(\text{PO}_4)_2$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+	=====+	=====+
O4P	2	14265-44-2
Mn	1	7439-96-5
Li	2	7439-93-2
Fe	1	7439-89-6

RN 412351-36-1 HCA

CN Iron lithium manganese phosphate ($\text{Fe}_{0.9}\text{LiMn}_{0.1}(\text{PO}_4)$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+	=====+	=====+

O4P		1		14265-44-2
Mn		0.1		7439-96-5
Li		1		7439-93-2
Fe		0.9		7439-89-6

RN 464174-82-1 HCA

CN Iron lithium manganese phosphate ((Fe,Mn)LiO-1(PO4)) (9CI) (CA INDEX NAME)

Component		Ratio		Component Registry Number
=====	+	=====	+	=====
O4P		1		14265-44-2
Mn		0 - 1		7439-96-5
Li		0 - 1		7439-93-2
Fe		0 - 1		7439-89-6

RN 474903-00-9 HCA

CN Iron lithium manganese phosphate (Fe0.3LiMn0.7(PO4)) (9CI) (CA INDEX NAME)

Component		Ratio		Component Registry Number
=====	+	=====	+	=====
O4P		1		14265-44-2
Mn		0.7		7439-96-5
Li		1		7439-93-2
Fe		0.3		7439-89-6

RN 474903-03-2 HCA

CN Iron lithium manganese phosphate (Fe0.1LiMn0.9(PO4)) (9CI) (CA INDEX NAME)

Component		Ratio		Component Registry Number
=====	+	=====	+	=====
O4P		1		14265-44-2
Mn		0.9		7439-96-5
Li		1		7439-93-2
Fe		0.1		7439-89-6

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 73ST **cathode** iron lithium manganese phosphate **battery**
; iron lithium manganese phosphate x ray absorption spectroscopyIT Carbon black, uses
(**cathode** contg.; x-ray absorption spectroscopy of iron
lithium manganese phosphate **cathodes** for lithium

batteries)

IT Secondary **batteries**
(lithium; x-ray absorption spectroscopy of iron lithium manganese phosphate **cathodes** for lithium **batteries**)

IT **Battery cathodes**
(x-ray absorption spectroscopy of iron lithium manganese phosphate **cathodes** for lithium **batteries**)

IT 13826-59-0, Lithium manganese phosphate (LiMnPO_4)
213467-46-0, Iron lithium manganese phosphate
($\text{FeLi}_2\text{Mn}(\text{PO}_4)_2$) 300858-61-1, Iron lithium manganese phosphate
($\text{Fe}_{0.4}\text{LiMn}_{0.6}(\text{PO}_4)$) 371145-95-8, Iron lithium manganese phosphate
($\text{Fe}_{0.25}\text{LiMn}_{0.75}(\text{PO}_4)$) 407629-83-8 **412351-36-1**, Iron
lithium manganese phosphate ($\text{Fe}_{0.9}\text{LiMn}_{0.1}(\text{PO}_4)$) **464174-82-1**
, Iron lithium manganese phosphate ($(\text{Fe},\text{Mn})\text{LiO}-1(\text{PO}_4)$)
464174-83-2, Iron lithium manganese phosphate ($\text{Fe}_{0.6}\text{LiMn}_{0.4}(\text{PO}_4)$)
474903-00-9, Iron lithium manganese phosphate
($\text{Fe}_{0.3}\text{LiMn}_{0.7}(\text{PO}_4)$) **474903-03-2**, Iron lithium manganese
phosphate ($\text{Fe}_{0.1}\text{LiMn}_{0.9}(\text{PO}_4)$) 474903-04-3, Iron lithium manganese
phosphate ($\text{Fe}_{0.75}\text{LiMn}_{0.25}(\text{PO}_4)$)
(x-ray absorption spectroscopy of iron lithium manganese
phosphate **cathodes** for lithium **batteries**)

L37 ANSWER 4 OF 22 HCA COPYRIGHT 2006 ACS on STN
138:125008 **Cathode** materials for secondary lithium
batteries. Armand, Michel; Goodenough, John B.; Padhi,
Akshaya K.; Nanjundaswamy, Kirakodu S.; Masquelier, Christian (Board
of Regents, the University of Texas System, USA). U.S. US 6514640
B1 20030204, 21 pp., Cont.-in-part of U.S. 5,910,382. (English).
CODEN: USXXAM. APPLICATION: US 1997-998264 19971224. PRIORITY: US
1996-PV16060 19960423; US 1996-PV32346 19961204; US 1997-840523
19970421.

AB The invention relates to materials for use as **electrodes**
in an alkali-ion secondary **battery**, particularly a
lithium-ion **battery**. The invention provides
transition-metal compds. having the ordered-olivine, a modified
olivine, or the rhombohedral NASICON structure and the polyanion
(PO_4) $^{3-}$ as at least one constituent for use as **electrode**
material for alkali-ion rechargeable **batteries**.

IT **223505-09-7**, Iron lithium titanium phosphate
(**cathode** materials for secondary lithium
batteries)

RN 223505-09-7 HCA

CN Iron lithium titanium phosphate (9CI) (CA INDEX NAME)

Component	Ratio	Component
		Registry Number
=====	=====	=====
O4P	x	14265-44-2

Ti		x		7440-32-6
Li		x		7439-93-2
Fe		x		7439-89-6

IT **488829-05-6P**, Iron lithium manganese phosphate
(Fe_{0.5}-1LiMn_{0.5}(PO₄))
(**cathode** materials for secondary lithium
batteries)

RN 488829-05-6 HCA

CN Iron lithium manganese phosphate (Fe_{0.5}-1LiMn_{0.5}(PO₄)) (9CI) (CA
INDEX NAME)

Component		Ratio		Component Registry Number
=====	+	=====	+	=====
O4P		1		14265-44-2
Mn		0 - 0.5		7439-96-5
Li		1		7439-93-2
Fe		0.5 - 1		7439-89-6

IT **7440-44-0**, Carbon, uses
(**cathode materials** for secondary lithium
batteries)

RN 7440-44-0 HCA

CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IC ICM H01M004-58

INCL 429231100; 429218100; 429224000; 429221000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **cathode** lithium secondary **battery**

IT Transition metal nitrides

(Li-contg.; **cathode** materials for secondary lithium
batteries)

IT EPDM rubber

Fluoropolymers, uses

Polyesters, uses

Polyethers, uses

(binder; **cathode** materials for secondary lithium
batteries)

IT **Battery anodes**

Battery cathodes

(**cathode** materials for secondary lithium
batteries)

IT Chalcogenides

(lamellar; **cathode** materials for secondary lithium

- batteries)**
- IT Secondary **batteries**
(lithium; **cathode** materials for secondary lithium **batteries)**
- IT Lithium alloy, base
(**cathode** materials for secondary lithium **batteries)**
- IT 116-14-3D, Tetrafluoroethylene, copolymer 9002-84-0, Ptfе
9011-14-7, Pmma 24937-79-9, Pvdf 25014-41-9, Polyacrylonitrile
(binder; **cathode** materials for secondary lithium **batteries)**
- IT 69104-84-3, Sodium vanadiumphosphate $\text{Na}_3\text{V}_2(\text{PO}_4)_3$
(**cathode** materials for secondary lithium **batteries)**
- IT 96-48-0, γ -Butyrolactone 96-49-1, Ethylene carbonate
105-58-8, Diethyl carbonate 107-21-1D, Ethylene glycol, dialkyl
ether 108-32-7, Propylene carbonate 111-46-6D, DiEthylene
glycol, dialkyl ether 112-27-6D, TriEthylene glycol, dialkyl ether
112-60-7D, TetraEthylene glycol, dialkyl ether 616-38-6, Dimethyl
carbonate 623-53-0, Methyl ethyl carbonate 7439-93-2, Lithium,
uses 7803-58-9D, Sulfamide, tetraalkyl deriv. 36058-25-0, Iron
lithium phosphate $\text{Fe}_2\text{Li}_3(\text{PO}_4)_3$ 39302-37-9, Lithium titanium oxide
39448-96-9, **Graphite**-lithium 77641-62-4, Nasicon
223505-09-7, Iron lithium titanium phosphate 277742-93-5,
Vanadium oxide $\text{VO}_{2.1-2.5}$
(**cathode** materials for secondary lithium **batteries)**
- IT 13824-63-0P, Cobalt lithium phosphate colipo4 13826-59-0P, Lithium
manganese phosphate limnpo4 13977-83-8P, Lithium nickel phosphate
linipo4 15365-14-7P, Iron lithium phosphate felipo4 37144-98-2P,
Niobium titanium phosphate $\text{NbTi}(\text{PO}_4)_3$ 184241-62-1P 196612-01-8P,
Lithium sodium vanadium phosphate $\text{Li}_2\text{NaV}_2(\text{PO}_4)_3$ 196612-05-2P, Iron
lithium niobium phosphate $\text{FeLiNb}(\text{PO}_4)_3$ 205380-60-5P, Iron lithium
phosphate sulfate $\text{Fe}_2\text{Li}(\text{PO}_4)(\text{SO}_4)_2$ **488829-05-6P**, Iron
lithium manganese phosphate $(\text{Fe}_{0.5}\text{-1LiMn}_{0.5}(\text{PO}_4))$ 488829-06-7P,
Iron lithium titanium phosphate silicate
 $(\text{Fe}_{0.8}\text{Li}_{1.1}\text{Ti}(\text{PO}_4)_{0.8}(\text{SiO}_4)_{0.2})$
(**cathode** materials for secondary lithium **batteries)**
- IT **7440-44-0**, Carbon, uses
(**cathode materials** for secondary lithium **batteries)**
- L37 ANSWER 5 OF 22 HCA COPYRIGHT 2006 ACS on STN
- 138:6481 Process for producing **carbon-containing**
lithium-iron composite phosphorus oxide for lithium secondary
battery cathode active material. Kohzaki, Masao;
Takeuchi, Youji; Ukyo, Yoshio (Kabushiki Kaisha Toyota Chuo

Kenkyusho, Japan). U.S. Pat. Appl. Publ. US 2002182497 A1
20021205, 11 pp. (English). CODEN: USXXCO. APPLICATION:
 US 2002-143946 20020514. PRIORITY: JP 2001-145396 20010515.

AB A **carbon-contg.** lithium-iron composite
 phosphorus oxide for a lithium secondary **battery** pos.
electrode active material, includes particles being composed
 of a lithium-iron composite phosphorus oxide having an olivine
 structure whose basic compn. is LiFePO_4 , and being composited with
carbonaceous fine particles. A process for producing the
 same includes the steps of mixing a lithium compd. making a lithium
 source, an iron compd. making an iron source, a phosphorus-contg.
 ammonium salt making a phosphorus source and **carbonaceous**
 fine particles, thereby prepg. a mixt., and calcicing the mixt. at a
 temp. of from 600° or more to 750° or less.

IT **476669-99-5P**, Iron lithium manganese phosphate
 $(\text{Fe}_{0.8-0.98}\text{LiMn}_{0.02-0.2}(\text{PO}_4))$ **476670-03-8P**, Iron lithium
 nickel phosphate $(\text{Fe}_{0.8-0.98}\text{LiNi}_{0.02-0.2}(\text{PO}_4))$ **476670-05-0P**
 , Cobalt iron lithium phosphate $(\text{Co}_{0.02-0.2}\text{Fe}_{0.8-0.98}\text{Li}(\text{PO}_4))$
 (carbon composited; process for producing **carbon-**
contg. lithium-iron composite phosphorus oxide for
 lithium secondary **battery cathode** active
 material)

RN 476669-99-5 HCA

CN Iron lithium manganese phosphate $(\text{Fe}_{0.8-0.98}\text{LiMn}_{0.02-0.2}(\text{PO}_4))$ (9CI)
 (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0.02 - 0.2	7439-96-5
Li	1	7439-93-2
Fe	0.8 - 0.98	7439-89-6

RN 476670-03-8 HCA

CN Iron lithium nickel phosphate $(\text{Fe}_{0.8-0.98}\text{LiNi}_{0.02-0.2}(\text{PO}_4))$ (9CI)
 (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Ni	0.02 - 0.2	7440-02-0
Li	1	7439-93-2
Fe	0.8 - 0.98	7439-89-6

RN 476670-05-0 HCA

CN Cobalt iron lithium phosphate $(\text{Co}_{0.02-0.2}\text{Fe}_{0.8-0.98}\text{Li}(\text{PO}_4))$ (9CI)

(CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Co	0.02 - 0.2	7440-48-4
Li	1	7439-93-2
Fe	0.8 - 0.98	7439-89-6

IT **7440-44-0**, Carbon, uses
 (composited with lithium iron phosphate; process for producing
carbon-contg. lithium-iron composite phosphorus
 oxide for lithium secondary **battery cathode**
 active material)

RN 7440-44-0 HCA

CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT **412351-36-1P**, Iron lithium manganese phosphate
 (Fe_{0.9}LiMn_{0.1}(PO₄)) **476670-14-1P**, Iron lithium manganese
 phosphate (Fe_{0.85}LiMn_{0.15}(PO₄))
 (process for producing **carbon-contg.**
 lithium-iron composite phosphorus oxide for lithium secondary
battery cathode active material)

RN 412351-36-1 HCA

CN Iron lithium manganese phosphate (Fe_{0.9}LiMn_{0.1}(PO₄)) (9CI) (CA
 INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0.1	7439-96-5
Li	1	7439-93-2
Fe	0.9	7439-89-6

RN 476670-14-1 HCA

CN Iron lithium manganese phosphate (Fe_{0.85}LiMn_{0.15}(PO₄)) (9CI) (CA
 INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0.15	7439-96-5

Li		1		7439-93-2
Fe		0.85		7439-89-6

IC ICM H01M004-58
 INCL 429221000; 429232000; 252182100
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 49
 ST **battery cathode carbon contg**
 lithium iron composite phosphorus oxide
 IT Carbon black, uses
 (composited with lithium iron phosphate; process for producing
carbon-contg. lithium-iron composite phosphorus
 oxide for lithium secondary **battery cathode**
 active material)
 IT Secondary **batteries**
 (lithium; process for producing **carbon-contg.**
 lithium-iron composite phosphorus oxide for lithium secondary
battery cathode active material)
 IT **Battery cathodes**
 (process for producing **carbon-contg.**
 lithium-iron composite phosphorus oxide for lithium secondary
battery cathode active material)
 IT 15365-14-7P, Iron lithium phosphate FeLiPO_4 **476669-99-5P**,
 Iron lithium manganese phosphate ($\text{Fe}_{0.8}\text{-}_{0.98}\text{LiMn}_{0.02}\text{-}_{0.2}(\text{PO}_4)$)
 476670-01-6P, Iron lithium magnesium phosphate ($\text{Fe}_{0.8}\text{-}_{0.98}\text{LiMg}_{0.02}\text{-}_{0.2}(\text{PO}_4)$) **476670-03-8P**, Iron lithium nickel phosphate
 ($\text{Fe}_{0.8}\text{-}_{0.98}\text{LiNi}_{0.02}\text{-}_{0.2}(\text{PO}_4)$) **476670-05-0P**, Cobalt iron
 lithium phosphate ($\text{Co}_{0.02}\text{-}_{0.2}\text{Fe}_{0.8}\text{-}_{0.98}\text{Li}(\text{PO}_4)$) 476670-07-2P,
 Copper iron lithium phosphate ($\text{Cu}_{0.02}\text{-}_{0.2}\text{Fe}_{0.8}\text{-}_{0.98}\text{Li}(\text{PO}_4)$)
 476670-10-7P, Iron lithium zinc phosphate ($\text{Fe}_{0.8}\text{-}_{0.98}\text{LiZn}_{0.02}\text{-}_{0.2}(\text{PO}_4)$)
 476670-12-9P, Germanium iron lithium phosphate
 ($\text{Ge}_{0.02}\text{-}_{0.2}\text{Fe}_{0.8}\text{-}_{0.98}\text{Li}(\text{PO}_4)$)
 (carbon composited; process for producing **carbon-**
contg. lithium-iron composite phosphorus oxide for
 lithium secondary **battery cathode** active
 material)
 IT **7440-44-0**, Carbon, uses
 (composited with lithium iron phosphate; process for producing
carbon-contg. lithium-iron composite phosphorus
 oxide for lithium secondary **battery cathode**
 active material)
 IT 516-03-0, Ferrous oxalate 554-13-2 7722-76-1, Ammonium
 dihydrogen phosphate
 (process for producing **carbon-contg.**
 lithium-iron composite phosphorus oxide for lithium secondary
battery cathode active material)
 IT **412351-36-1P**, Iron lithium manganese phosphate
 ($\text{Fe}_{0.9}\text{LiMn}_{0.1}(\text{PO}_4)$) **476670-14-1P**, Iron lithium manganese

phosphate ($\text{Fe}_{0.85}\text{LiMn}_{0.15}(\text{PO}_4)$)
 (process for producing **carbon-contg.**
 lithium-iron composite phosphorus oxide for lithium secondary
battery cathode active material)

L37 ANSWER 6 OF 22 HCA COPYRIGHT 2006 ACS on STN

137:355365 Optimized $\text{LiMnyFe}_{1-y}\text{PO}_4$ as the **cathode** for lithium
batteries. Li, Guohua; Azuma, Hideto; Tohda, Masayuki
 (Nishi Battery Laboratories, Sony Corporation, Atsugi, 243-0021,
 Japan). Journal of the Electrochemical Society, 149(6), A743-A747
 (English) **2002**. CODEN: JESOAN. ISSN: 0013-4651.
 Publisher: Electrochemical Society.

AB A new synthesis route has been developed for $\text{LiMnyFe}_{1-y}\text{PO}_4$ ($y =$
 $0-0.9$) powders. A significant improvement in **electrode**
 performance has been achieved by adding carbon black to the
 synthetic precursor. The **carbon-contg.**
 $\text{LiMnyFe}_{1-y}\text{PO}_4$ was synthesized under various conditions and the
 performance of the **cathodes** was evaluated using coin
 cells. The samples were characterized by X-ray diffraction,
 particle-size distribution measurements, scanning electron
 microscope observations, and BET surface area measurements. The
 addn. of carbon black limited the particle size growth and enabled
 high electronic cond. Another advantage is simplification of
electrode prepn., only needs the **cathode** powder to
 be mixed with binder. At large Mn content ($y = 0.75$), a high
 capacity of 164 mAh/g has been achieved with an av. discharge
 voltage of 3.63 V (595 Wh/kg) at room temp. In addn., $\text{LiMnyFe}_{1-y}\text{PO}_4$
 demonstrated excellent storage performance at elevated temps. The
 thermal stability of the charged **cathode** was evaluated by
 thermogravimetric and differential scanning calorimetric thermal
 analyses.

IT **213467-46-0**, Iron lithium manganese phosphate
 ($\text{FeLi}_2\text{Mn}(\text{PO}_4)_2$) **407640-52-2**, Iron lithium manganese
 phosphate ($\text{Fe}_{0.1-1}\text{LiMn}_{0-0.9}(\text{PO}_4)$) **412351-36-1**, Iron
 lithium manganese phosphate ($\text{Fe}_{0.9}\text{LiMn}_{0.1}(\text{PO}_4)$) **474902-99-3**
 , Iron lithium manganese phosphate ($\text{Fe}_{0.35}\text{LiMn}_{0.65}(\text{PO}_4)$)
474903-00-9, Iron lithium manganese phosphate
 ($\text{Fe}_{0.3}\text{LiMn}_{0.7}(\text{PO}_4)$) **474903-03-2**, Iron lithium manganese
 phosphate ($\text{Fe}_{0.1}\text{LiMn}_{0.9}(\text{PO}_4)$)
 (**cathode**; optimized high-manganese-content
carbon black-contg. lithium manganese iron
 phosphates as **cathodes** for rechargeable lithium
batteries)

RN 213467-46-0 HCA

CN Iron lithium manganese phosphate ($\text{FeLi}_2\text{Mn}(\text{PO}_4)_2$) (9CI) (CA INDEX
 NAME)

Component		Ratio		Component
-----------	--	-------	--	-----------

		Registry Number
=====	=====	=====
O4P	2	14265-44-2
Mn	1	7439-96-5
Li	2	7439-93-2
Fe	1	7439-89-6

RN 407640-52-2 HCA

CN Iron lithium manganese phosphate (Fe0.1-1LiMn0-0.9(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0 - 0.9	7439-96-5
Li	1	7439-93-2
Fe	0.1 - 1	7439-89-6

RN 412351-36-1 HCA

CN Iron lithium manganese phosphate (Fe0.9LiMn0.1(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0.1	7439-96-5
Li	1	7439-93-2
Fe	0.9	7439-89-6

RN 474902-99-3 HCA

CN Iron lithium manganese phosphate (Fe0.35LiMn0.65(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0.65	7439-96-5
Li	1	7439-93-2
Fe	0.35	7439-89-6

RN 474903-00-9 HCA

CN Iron lithium manganese phosphate (Fe0.3LiMn0.7(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component
-----------	-------	-----------

		Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0.7	7439-96-5
Li	1	7439-93-2
Fe	0.3	7439-89-6

RN 474903-03-2 HCA

CN Iron lithium manganese phosphate (Fe_{0.1}LiMn_{0.9}(PO₄)) (9CI) (CA
INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0.9	7439-96-5
Li	1	7439-93-2
Fe	0.1	7439-89-6

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST lithium manganese iron phosphate carbon black **battery**

cathode; rechargeable lithium battery

cathode carbon lithium manganese iron phosphate

IT Carbon black, uses

(**cathodes; optimized high-manganese-content
carbon black-contg. lithium manganese iron
phosphates as cathodes for rechargeable lithium
batteries**)

IT Electric conductivity

(of **cathodes; optimized high-manganese-content
carbon black-contg. lithium manganese iron
phosphates as cathodes for rechargeable lithium
batteries**)

IT **Battery cathodes**

(optimized high-manganese-content **carbon black-
contg. lithium manganese iron phosphates as
cathodes for rechargeable lithium batteries**)

IT 15365-14-7, Iron lithium phosphate (FeLiPO₄) **213467-46-0**,
Iron lithium manganese phosphate (FeLi₂Mn(PO₄)₂) 300858-61-1
371145-95-8 407629-83-8 **407640-52-2**, Iron lithium
manganese phosphate (Fe_{0.1}-1LiMn_{0-0.9}(PO₄)) **412351-36-1**,
Iron lithium manganese phosphate (Fe_{0.9}LiMn_{0.1}(PO₄)) 464174-83-2
464174-90-1 **474902-99-3**, Iron lithium manganese phosphate
(Fe_{0.35}LiMn_{0.65}(PO₄)) **474903-00-9**, Iron lithium manganese
phosphate (Fe_{0.3}LiMn_{0.7}(PO₄)) **474903-03-2**, Iron lithium
manganese phosphate (Fe_{0.1}LiMn_{0.9}(PO₄)) 474903-04-3
(**cathode; optimized high-manganese-content
carbon black-contg. lithium manganese iron**

phosphates as **cathodes** for rechargeable lithium
batteries)

L37 ANSWER 7 OF 22 HCA COPYRIGHT 2006 ACS on STN

137:265592 secondary lithium **battery**. Fujita, Shigeru;
Akashi, Hiroyuki; Adachi, Momoe; Shibamoto, Goro (Sony Corp.,
Japan). Jpn. Kokai Tokkyo Koho JP 2002279989 A2 **20020927**,
13 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-77086
20010316.

AB The **battery** has a Li intercalating and depositing
anode and a oxide **cathode** active mass contg. Li, P
and ≥ 1 of Fe, Mn and Co. The **cathode** may also
contain a 2nd oxide active mass contg. Li and ≥ 1 of Co, Ni,
and Mn. The **anode** active mass is selected from Li
intercalating **carbonaceous** materials and metals,
semiconductors, alloys, and compds. capable of alloying with Li.

IT **213467-46-0**, Iron lithium manganese phosphate
[FeLi₂Mn(PO₄)₂]
(compns. of oxide **cathodes** for secondary lithium
batteries with lithium intercalating and depositing
anodes)

RN 213467-46-0 HCA

CN Iron lithium manganese phosphate (FeLi₂Mn(PO₄)₂) (9CI) (CA INDEX
NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	2	14265-44-2
Mn	1	7439-96-5
Li	2	7439-93-2
Fe	1	7439-89-6

IT **7782-42-5, Graphite**, uses
(lithium intercalating and depositing **anodes** for
secondary lithium **batteries** with oxide **cathodes**
)

RN 7782-42-5 HCA

CN Graphite (8CI, 9CI) (CA INDEX NAME)

C

IC ICM H01M004-58

ICS H01M004-02; H01M004-38; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary lithium **battery** mixed metal oxide
cathode; phosphorus metal oxide **cathode** compn

- secondary **battery**
- IT **Battery cathodes**
(compsn. of oxide **cathodes** for secondary lithium **batteries** with lithium intercalating and depositing **anodes**)
- IT **Battery anodes**
(lithium intercalating and depositing **anodes** for secondary lithium **batteries** with oxide **cathodes**)
- IT **Carbonaceous materials** (technological products)
(lithium intercalating and depositing **anodes** for secondary lithium **batteries** with oxide **cathodes**)
- IT **Secondary batteries**
(lithium; secondary lithium **batteries** with oxide **cathodes** and lithium intercalating and depositing **anodes**)
- IT 12057-17-9, Lithium manganese oxide (LiMn_2O_4) 12190-79-3, Cobalt lithium oxide (CoLiO_2) 15365-14-7, Iron lithium phosphate (FeLiPO_4) 113066-89-0, Cobalt lithium nickel oxide ($\text{Co}_{0.2}\text{LiNi}_{0.8}\text{O}_2$) **213467-46-0**, Iron lithium manganese phosphate [$\text{FeLi}_2\text{Mn}(\text{PO}_4)_2$]
(compsn. of oxide **cathodes** for secondary lithium **batteries** with lithium intercalating and depositing **anodes**)
- IT 7429-90-5, Aluminum, uses 7439-92-1, Lead, uses 7439-95-4, Magnesium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-36-0, Antimony, uses 7440-38-2, Arsenic, uses 7440-42-8, Boron, uses 7440-43-9, Cadmium, uses 7440-55-3, Gallium, uses 7440-56-4, Germanium, uses 7440-58-6, Hafnium, uses 7440-65-5, Yttrium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses 7440-69-9, Bismuth, uses 7440-74-6, Indium, uses **7782-42-5**, **Graphite**, uses
(lithium intercalating and depositing **anodes** for secondary lithium **batteries** with oxide **cathodes**)
- L37 ANSWER 8 OF 22 HCA COPYRIGHT 2006 ACS on STN
- 136:312584 Method for preparation of **cathode** active material for nonaqueous lithium secondary **battery**. Sato, Atsushi; Kuyama, Junji; Fukushima, Yuzuru; Hosoya, Mamoru (Sony Corp., Japan). Eur. Pat. Appl. EP 1198019 A2 **20020417**, 15 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123899 20011005. PRIORITY: JP 2000-308299 20001006.
- AB A nonaq. **electrolyte cell** includes a **cathode** contg. a **cathode** active material, which is

mainly composed of a compd. represented by the general formula Li_xFePO_4 , where $0 < x \leq 1$, with the molar ratio of Li_3PO_4 to a compd. represented by the general formula Li_xFePO_4 , which ratio is represented by $\text{Li}_3\text{PO}_4/\text{LiFePO}_4$, being $\text{Li}_3\text{PO}_4/\text{LiFePO}_4 \leq 6.67 + 10^{-2}$. Starting materials for the synthesis of compd. Li_xFePO_4 where $0 < x \leq 1$ are Li_3PO_4 and $\text{Fe}_3(\text{PO}_4)_2$ or $\text{Fe}_3(\text{PO}_4)_2 \cdot n\text{H}_2\text{O}$ when n denotes a no. of hydrates.

IT **7782-42-5, Graphite**, uses
(method for prepn. of **cathode** active material for
nonaq. lithium secondary **battery**)
RN 7782-42-5 HCA
CN Graphite (8CI, 9CI) (CA INDEX NAME)

C

IT **198782-39-7P**, Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$)
(method for prepn. of **cathode** active material for
nonaq. lithium secondary **battery**)
RN 198782-39-7 HCA
CN Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O4P	1	14265-44-2
Li	0 - 1	7439-93-2
Fe	1	7439-89-6

IC ICM H01M004-58
ICS H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST lithium nonaq secondary **battery cathode** prepn
IT Secondary **batteries**
(lithium; method for prepn. of **cathode** active material
for nonaq. lithium secondary **battery**)
IT **Battery cathodes**
Battery electrolytes
(method for prepn. of **cathode** active material for
nonaq. lithium secondary **battery**)
IT Fluoropolymers, uses
(method for prepn. of **cathode** active material for
nonaq. lithium secondary **battery**)
IT 10028-23-6, Phosphoric acid, iron(2+) salt (2:3)octahydrate
10377-52-3, Trilithium phosphate 14940-41-1, Iron phosphate
 $\text{fe}_3(\text{po}_4)_2$ 31096-55-6, Phosphoric acid, iron(2+) salt (2:3) hydrate
(method for prepn. of **cathode** active material for
nonaq. lithium secondary **battery**)

- IT 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate
7782-42-5, Graphite, uses 21324-40-3, Lithium hexafluorophosphate
(method for prepn. of **cathode** active material for nonaq. lithium secondary **battery**)
- IT **198782-39-7P**, Iron lithium phosphate ($\text{FeLi}_{0.1}(\text{PO}_4)$)
(method for prepn. of **cathode** active material for nonaq. lithium secondary **battery**)
- IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer
24937-79-9, PvdF
(method for prepn. of **cathode** active material for nonaq. lithium secondary **battery**)
- L37 ANSWER 9 OF 22 HCA COPYRIGHT 2006 ACS on STN
136:297400 Nonaqueous electrolyte secondary **battery** using olivinic lithium phosphorus oxide **cathode** active material. Okawa, Tsuyoshi; Hosoya, Mamoru; Kuyama, Junji; Fukushima, Yuzuru (Sony Corporation, Japan). Eur. Pat. Appl. EP 1195837 A2 **20020410**, 15 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123893 20011005. PRIORITY: JP 2000-308302 20001006.
- AB In a **battery**, liq. leakage or destruction may be prevented as the apparent energy d. per unit vol. of the cell is maintained. The cell uses, as a **cathode** active material, a compd. of an olivinic crystal structure having the formula $\text{Li}_x\text{Fe}_{1-x}\text{M}_y\text{PO}_4$, where M is at least one selected from the group of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb and $0.05 \leq x \leq 1.2$ and $0 \leq y \leq 0.8$. By adjusting the amt. of the electrolyte soln., the amt. of the void in the container is set so as to be not less than 0.14 mL and not more than 3.3 mL per 1 Ah of the cell capacity.
- IT **7440-44-0**, Carbon, uses **407606-24-0**, Cobalt iron lithium phosphate ($\text{Co}_{0.8}\text{Fe}_{0.2}\text{Li}_{0.05}\text{Li}_{1.2}(\text{PO}_4)$)
407606-34-2, Iron lithium manganese phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Li}_{1.2}\text{Mn}_{0.8}(\text{PO}_4)$) **407606-36-4**, Iron lithium nickel phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Li}_{1.2}\text{Ni}_{0.8}(\text{PO}_4)$) **407606-44-4**, Iron lithium titanium phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Li}_{1.2}\text{Ti}_{0.8}(\text{PO}_4)$)
(nonaq. electrolyte secondary **battery** using olivinic lithium phosphorus oxide **cathode** active material)
- RN 7440-44-0 HCA
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)
- C
- RN 407606-24-0 HCA
CN Cobalt iron lithium phosphate ($\text{Co}_{0.8}\text{Fe}_{0.2}\text{Li}_{0.05}\text{Li}_{1.2}(\text{PO}_4)$) (9CI)

(CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Co	0 - 0.8	7440-48-4
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-34-2 HCA

CN Iron lithium manganese phosphate (Fe0.2-1Li0.05-1.2Mn0-0.8(PO4))
(9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0 - 0.8	7439-96-5
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-36-4 HCA

CN Iron lithium nickel phosphate (Fe0.2-1Li0.05-1.2Ni0-0.8(PO4)) (9CI)
(CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Ni	0 - 0.8	7440-02-0
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-44-4 HCA

CN Iron lithium titanium phosphate (Fe0.2-1Li0.05-1.2Ti0-0.8(PO4))
(9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Ti	0 - 0.8	7440-32-6
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

IC ICM H01M010-40

ICS H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery** olivinic lithium phosphorus oxide **cathode**
; nonaq electrolyte lithium secondary **battery**

IT Secondary **batteries**
(lithium; nonaq. electrolyte secondary **battery** using
olivinic lithium phosphorus oxide **cathode** active
material)

IT **Battery cathodes**
Composites
(nonaq. electrolyte secondary **battery** using olivinic
lithium phosphorus oxide **cathode** active material)

IT Coke
(pitch; nonaq. electrolyte secondary **battery** using
olivinic lithium phosphorus oxide **cathode** active
material)

IT 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate
7440-44-0, Carbon, uses 15365-14-7, Iron lithium phosphate
felipo4 21324-40-3, Lithium hexafluorophosphate 407606-22-8,
Chromium iron lithium phosphate (Cr0-0.8Fe0.2-1Li0.05-1.2(PO4))
407606-24-0, Cobalt iron lithium phosphate
(Co0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-26-2, Copper iron lithium
phosphate (Cu0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-28-4, Aluminum
iron lithium phosphate (Al0-0.8Fe0.2-1Li0.05-1.2(PO4))
407606-30-8, Gallium iron lithium phosphate (Ga0-0.8Fe0.2-1Li0.05-
1.2(PO4)) 407606-32-0, Boron iron lithium phosphate
(B0-0.8Fe0.2-1Li0.05-1.2(PO4)) **407606-34-2**, Iron lithium
manganese phosphate (Fe0.2-1Li0.05-1.2Mn0-0.8(PO4))
407606-36-4, Iron lithium nickel phosphate
(Fe0.2-1Li0.05-1.2Ni0-0.8(PO4)) 407606-39-7, Iron lithium vanadium
phosphate (Fe0.2-1Li0.05-1.2V0-0.8(PO4)) 407606-42-2, Iron lithium
molybdenum phosphate (Fe0.2-1Li0.05-1.2Mo0-0.8(PO4))
407606-44-4, Iron lithium titanium phosphate
(Fe0.2-1Li0.05-1.2Ti0-0.8(PO4)) 407606-47-7, Iron lithium zinc
phosphate (Fe0.2-1Li0.05-1.2Zn0-0.8(PO4)) 407606-49-9, Iron
lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4))
407606-51-3, Iron lithium niobium phosphate (Fe0.2-1Li0.05-1.2Nb0-
0.8(PO4)) 407629-83-8 407629-87-2 407629-90-7 407629-95-2
407630-01-7 407630-05-1 407630-10-8 407630-14-2 407630-19-7
407630-25-5, Aluminum iron lithium phosphate (Al0.7Fe0.3Li(PO4))
407630-29-9, Gallium iron lithium phosphate (Ga0.7Fe0.3Li(PO4))
407630-35-7 407630-40-4, Boron iron lithium phosphate
(B0.75Fe0.25Li(PO4)) 407630-46-0
(nonaq. electrolyte secondary **battery** using olivinic
lithium phosphorus oxide **cathode** active material)

L37 ANSWER 10 OF 22 HCA COPYRIGHT 2006 ACS on STN
136:297399 Nonaqueous electrolyte secondary **battery** with a
compound of an olivinic structure as a **cathode** active

material. Okawa, Tsuyoshi; Hosoya, Mamoru; Kuyama, Junji; Fukushima, Yuzuru (Sony Corporation, Japan). Eur. Pat. Appl. EP 1195836 A2 **20020410**, 15 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123892 20011005. PRIORITY: JP 2000-308301 20001006.

- AB A non-aq. **electrolyte secondary cell** contg. a compd. of an olivinic structure as a **cathode** active material is to be improved in load characteristics and cell capacity. To this end, there is provided a non-aq. **electrolyte secondary cell** including a **cathode** having a layer of a **cathode** active material contg. a compd. represented by the general formula $\text{Li}_x\text{Fe}_y\text{M}_y\text{PO}_4$, where M is at least one selected from the group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, with $0.05 \leq x \leq 1.2$ and $0 \leq y \leq 0.8$, an **anode** having a layer of an **anode** active material and a non-aq. electrolyte, wherein the layer of the **cathode** active material has a film thickness in a range from 25 to 110 μm . If a layer of a **cathode** active material is provided on each surface of a **cathode** current collector, the sum of the film thicknesses of the layers of the **cathode** active material ranges between 50 and 220 μm . The non-aq. electrolyte may be a liq.-based electrolyte or a polymer electrolyte.
- IT **7440-44-0**, Carbon, uses **7782-42-5**, **Graphite**, uses **407606-24-0**, Cobalt iron lithium phosphate ($\text{Co}_{0.8}\text{Fe}_{0.2}-1\text{Li}_{0.05}-1.2(\text{PO}_4)$) **407606-36-4**, Iron lithium nickel phosphate ($\text{Fe}_{0.2}-1\text{Li}_{0.05}-1.2\text{Ni}_{0.8}(\text{PO}_4)$) **407606-44-4**, Iron lithium titanium phosphate ($\text{Fe}_{0.2}-1\text{Li}_{0.05}-1.2\text{Ti}_{0.8}(\text{PO}_4)$) (nonaq. electrolyte secondary **battery** with compd. of olivinic structure as **cathode** active material)
- RN 7440-44-0 HCA
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

- RN 7782-42-5 HCA
CN Graphite (8CI, 9CI) (CA INDEX NAME)

C

- RN 407606-24-0 HCA
CN Cobalt iron lithium phosphate ($\text{Co}_{0.8}\text{Fe}_{0.2}-1\text{Li}_{0.05}-1.2(\text{PO}_4)$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O4P	1	14265-44-2
Co	0 - 0.8	7440-48-4
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-36-4 HCA

CN Iron lithium nickel phosphate (Fe_{0.2}-1Li_{0.05}-1.2Ni_{0-0.8}(PO₄)) (9CI)
(CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O4P	1	14265-44-2
Ni	0 - 0.8	7440-02-0
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-44-4 HCA

CN Iron lithium titanium phosphate (Fe_{0.2}-1Li_{0.05}-1.2Ti_{0-0.8}(PO₄))
(9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O4P	1	14265-44-2
Ti	0 - 0.8	7440-32-6
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

IC ICM H01M010-40

ICS H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery** secondary olivinic structure **cathode**
active material

IT Ball milling

Battery cathodes

Secondary **batteries**

(nonaq. electrolyte secondary **battery** with compd. of
olivinic structure as **cathode** active material)

IT Carbon black, uses

(nonaq. electrolyte secondary **battery** with compd. of
olivinic structure as **cathode** active material)

IT 10377-52-3, Lithium phosphate 13977-75-8, Phosphoric acid,
iron(3+) salt (3:2)

- (nonaq. electrolyte secondary **battery** with compd. of olivinic structure as **cathode** active material)
- IT 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate
7440-44-0, Carbon, uses **7782-42-5**,
Graphite, uses 15365-14-7, Iron lithium phosphate FeLiPO_4
 21324-40-3, Lithium hexafluorophosphate 407606-22-8, Chromium iron
 lithium phosphate ($\text{Cr}_{0.8}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$)
407606-24-0, Cobalt iron lithium phosphate
 ($\text{Co}_{0.8}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$) 407606-26-2, Copper iron lithium
 phosphate ($\text{Cu}_{0.8}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$) 407606-28-4, Aluminum
 iron lithium phosphate ($\text{Al}_{0.8}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$)
 407606-30-8, Gallium iron lithium phosphate ($\text{Ga}_{0.8}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$)
 407606-32-0, Boron iron lithium phosphate
 ($\text{B}_{0.8}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$) **407606-36-4**, Iron lithium
 nickel phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Ni}_{0.8}\text{PO}_4$) 407606-39-7, Iron
 lithium vanadium phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{V}_{0.8}\text{PO}_4$)
 407606-42-2, Iron lithium molybdenum phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Mo}_{0.8}\text{PO}_4$)
407606-44-4, Iron lithium titanium phosphate
 ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Ti}_{0.8}\text{PO}_4$) 407606-47-7, Iron lithium zinc
 phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Zn}_{0.8}\text{PO}_4$) 407606-49-9, Iron
 lithium magnesium phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Mg}_{0.8}\text{PO}_4$)
 407606-51-3, Iron lithium niobium phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Nb}_{0.8}\text{PO}_4$)
 407629-83-8 407629-87-2 407629-90-7 407629-95-2
 407630-01-7 407630-05-1 407630-10-8 407630-14-2 407630-19-7
 407630-25-5, Aluminum iron lithium phosphate ($\text{Al}_{0.7}\text{Fe}_{0.3}\text{LiPO}_4$)
 407630-29-9, Gallium iron lithium phosphate ($\text{Ga}_{0.7}\text{Fe}_{0.3}\text{LiPO}_4$)
 407630-35-7 407630-40-4, Boron iron lithium phosphate
 ($\text{B}_{0.75}\text{Fe}_{0.25}\text{LiPO}_4$) 407630-46-0
 (nonaq. electrolyte secondary **battery** with compd. of olivinic structure as **cathode** active material)
- IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer
 (nonaq. electrolyte secondary **battery** with compd. of olivinic structure as **cathode** active material)
- IT 7439-93-2, Lithium, uses
 (nonaq. electrolyte secondary **battery** with compd. of olivinic structure as **cathode** active material)

L37 ANSWER 11 OF 22 HCA COPYRIGHT 2006 ACS on STN

136:297398 **Cathode** and **anode** materials for solid

nonaqueous electrolyte **battery**. Takahashi, Kimio; Hosoya, Mamoru; Miyake, Masami (Sony Corporation, Japan). Eur. Pat. Appl. EP 1195835 A2 **20020410**, 22 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123773 20011004. PRIORITY: JP 2000-306877 20001005.

AB A **battery** is not deteriorated in cell characteristics and maintains the cell shape encapsulated in a laminate film even when overdischarged to a cell voltage of 0 V. The cell includes a

cathode contg. a compd. having the formula $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$, where M is at least one selected from the group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, with $0.05 \leq x \leq 1.2$ and $0 \leq y \leq 0.8$, an

anode and a solid electrolyte. A cell member comprised of the **cathode** and the **anode**, layered together with the interposition of a solid electrolyte, is encapsulated in a laminate film.

IT **7440-44-0**, Carbon, uses **407606-24-0**, Cobalt iron lithium phosphate ($\text{Co}_{0.8}\text{Fe}_{0.2}\text{Li}_{0.05-1.2}(\text{PO}_4)$) **407606-34-2**, Iron lithium manganese phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05-1.2}\text{Mn}_{0.8}(\text{PO}_4)$) **407606-36-4**, Iron lithium nickel phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05-1.2}\text{Ni}_{0.8}(\text{PO}_4)$) **407606-44-4**, Iron lithium titanium phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05-1.2}\text{Ti}_{0.8}(\text{PO}_4)$) (**cathode** and **anode** materials for solid nonaq. electrolyte **battery**)

RN 7440-44-0 HCA

CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

RN 407606-24-0 HCA

CN Cobalt iron lithium phosphate ($\text{Co}_{0.8}\text{Fe}_{0.2}\text{Li}_{0.05-1.2}(\text{PO}_4)$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Co	0 - 0.8	7440-48-4
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-34-2 HCA

CN Iron lithium manganese phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05-1.2}\text{Mn}_{0.8}(\text{PO}_4)$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0 - 0.8	7439-96-5
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-36-4 HCA

CN Iron lithium nickel phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05-1.2}\text{Ni}_{0.8}(\text{PO}_4)$) (9CI)

(CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Ni	0 - 0.8	7440-02-0
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-44-4 HCA

CN Iron lithium titanium phosphate (Fe_{0.2}-1Li_{0.05}-1.2Ti_{0-0.8}(PO₄))
(9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Ti	0 - 0.8	7440-32-6
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

IC ICM H01M010-40
ICS H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery** solid nonaq electrolyte **cathode**
anode material

IT **Battery anodes****Battery cathodes****Battery electrolytes**

(**cathode** and **anode** materials for solid nonaq.
electrolyte **battery**)

IT **7440-44-0**, Carbon, uses 15365-14-7, Iron lithium phosphate
felipo4 407606-22-8, Chromium iron lithium phosphate
(Cr_{0-0.8}Fe_{0.2}-1Li_{0.05}-1.2(PO₄)) **407606-24-0**, Cobalt iron
lithium phosphate (Co_{0-0.8}Fe_{0.2}-1Li_{0.05}-1.2(PO₄)) 407606-26-2,
Copper iron lithium phosphate (Cu_{0-0.8}Fe_{0.2}-1Li_{0.05}-1.2(PO₄))
407606-28-4, Aluminum iron lithium phosphate (Al_{0-0.8}Fe_{0.2}-1Li_{0.05}-
1.2(PO₄)) 407606-30-8, Gallium iron lithium phosphate
(Ga_{0-0.8}Fe_{0.2}-1Li_{0.05}-1.2(PO₄)) 407606-32-0, Boron iron lithium
phosphate (B_{0-0.8}Fe_{0.2}-1Li_{0.05}-1.2(PO₄)) **407606-34-2**, Iron
lithium manganese phosphate (Fe_{0.2}-1Li_{0.05}-1.2Mn_{0-0.8}(PO₄))
407606-36-4, Iron lithium nickel phosphate
(Fe_{0.2}-1Li_{0.05}-1.2Ni_{0-0.8}(PO₄)) 407606-39-7, Iron lithium vanadium
phosphate (Fe_{0.2}-1Li_{0.05}-1.2V_{0-0.8}(PO₄)) 407606-42-2, Iron lithium
molybdenum phosphate (Fe_{0.2}-1Li_{0.05}-1.2Mo_{0-0.8}(PO₄))
407606-44-4, Iron lithium titanium phosphate
(Fe_{0.2}-1Li_{0.05}-1.2Ti_{0-0.8}(PO₄)) 407606-47-7, Iron lithium zinc

phosphate ($\text{Fe}_{0.2}\text{-Li}_{0.05}\text{-1.2Zn}_{0.8}(\text{PO}_4)$) 407606-49-9, Iron lithium magnesium phosphate ($\text{Fe}_{0.2}\text{-Li}_{0.05}\text{-1.2Mg}_{0.8}(\text{PO}_4)$) 407606-51-3, Iron lithium niobium phosphate ($\text{Fe}_{0.2}\text{-Li}_{0.05}\text{-1.2Nb}_{0.8}(\text{PO}_4)$)

(**cathode** and **anode** materials for solid nonaq. electrolyte **battery**)

IT 7439-93-2, Lithium, uses

(**cathode** and **anode** materials for solid nonaq. electrolyte **battery**)

L37 ANSWER 12 OF 22 HCA COPYRIGHT 2006 ACS on STN

136:297395 Method for fabrication of **cathode** active material and a nonaqueous electrolyte **battery**. Hosoya, Mamoru; Fukushima, Yuzuru; Sakai, Hidecki; Kuyama, Junji (Sony Corporation, Japan). Eur. Pat. Appl. EP 1195827 A2 **20020410**, 31 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123894 20011005. PRIORITY: JP 2000-308300 20001006; JP 2000-308313 20001006.

AB The invention comprises a method for producing a **cathode** active material having superior cell characteristics through single-phase synthesis of a composite material composed of a compd. represented by the general formula $\text{Li}_x\text{Fe}_1\text{-yMyPO}_4$ and a **carbon material** pos. and a method for producing a non-aq. **electrolyte cell** employing the so produced **cathode** active material. To this end, the **cathode** active material is prepd. by a step of mixing the starting materials for synthesis of the compd. represented by the general formula $\text{Li}_x\text{Fe}_1\text{-yMyPO}_4$, a step of milling a mixt. obtained by the mixing step, a step of compressing the mixt. obtained by the mixing step to a preset d. and a step of sintering the mixt. obtained by the compressing step. A **carbon material** is added in any one of the above steps prior to the sintering step. The d. of the mixt. in the compressing step is set to not less than 1.71 g/cm^3 and not larger than 2.45 g/cm^3 .

IT **7440-44-0**, Carbon, uses **198782-39-7**, Iron lithium phosphate ($\text{FeLi}_{0.1}(\text{PO}_4)$) **407606-24-0**, Cobalt iron lithium phosphate ($\text{Co}_{0.8}\text{Fe}_{0.2}\text{-Li}_{0.05}\text{-1.2}(\text{PO}_4)$) **407606-34-2**, Iron lithium manganese phosphate ($\text{Fe}_{0.2}\text{-Li}_{0.05}\text{-1.2Mn}_{0.8}(\text{PO}_4)$) **407606-36-4**, Iron lithium nickel phosphate ($\text{Fe}_{0.2}\text{-Li}_{0.05}\text{-1.2Ni}_{0.8}(\text{PO}_4)$) **407606-44-4**, Iron lithium titanium phosphate ($\text{Fe}_{0.2}\text{-Li}_{0.05}\text{-1.2Ti}_{0.8}(\text{PO}_4)$) (method for fabrication of **cathode** active material and nonaq. electrolyte **battery**)

RN 7440-44-0 HCA

CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

RN 198782-39-7 HCA
 CN Iron lithium phosphate (FeLi0-1(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Li	0 - 1	7439-93-2
Fe	1	7439-89-6

RN 407606-24-0 HCA
 CN Cobalt iron lithium phosphate (Co0-0.8Fe0.2-1Li0.05-1.2(PO4)) (9CI)
 (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Co	0 - 0.8	7440-48-4
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-34-2 HCA
 CN Iron lithium manganese phosphate (Fe0.2-1Li0.05-1.2Mn0-0.8(PO4))
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mn	0 - 0.8	7439-96-5
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-36-4 HCA
 CN Iron lithium nickel phosphate (Fe0.2-1Li0.05-1.2Ni0-0.8(PO4)) (9CI)
 (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Ni	0 - 0.8	7440-02-0
Li	0.05 - 1.2	7439-93-2

Fe | 0.2 - 1 | 7439-89-6

RN 407606-44-4 HCA

CN Iron lithium titanium phosphate (Fe_{0.2}-1Li_{0.05}-1.2Ti_{0.8}(PO₄))
(9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Ti	0 - 0.8	7440-32-6
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

IC ICM H01M004-58

ICS H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **cathode** active material nonaq electrolyte **battery**

IT Ball milling

Battery cathodes

Composites

Secondary **batteries**

(method for fabrication of **cathode** active material and
nonaq. electrolyte **battery**)

IT Carbon black, uses

(method for fabrication of **cathode** active material and
nonaq. electrolyte **battery**)

IT **7440-44-0**, Carbon, uses **198782-39-7**, Iron lithium
phosphate (FeLi₀-1(PO₄)) 407606-22-8, Chromium iron lithium
phosphate (Cr₀-0.8Fe_{0.2}-1Li_{0.05}-1.2(PO₄)) **407606-24-0**,
Cobalt iron lithium phosphate (Co₀-0.8Fe_{0.2}-1Li_{0.05}-1.2(PO₄))
407606-26-2, Copper iron lithium phosphate (Cu₀-0.8Fe_{0.2}-1Li_{0.05}-
1.2(PO₄)) 407606-28-4, Aluminum iron lithium phosphate
(Al₀-0.8Fe_{0.2}-1Li_{0.05}-1.2(PO₄)) 407606-30-8, Gallium iron lithium
phosphate (Ga₀-0.8Fe_{0.2}-1Li_{0.05}-1.2(PO₄)) 407606-32-0, Boron iron
lithium phosphate (B₀-0.8Fe_{0.2}-1Li_{0.05}-1.2(PO₄)) **407606-34-2**
, Iron lithium manganese phosphate (Fe_{0.2}-1Li_{0.05}-1.2Mn_{0.8}(PO₄))
407606-36-4, Iron lithium nickel phosphate
(Fe_{0.2}-1Li_{0.05}-1.2Ni_{0.8}(PO₄)) 407606-39-7, Iron lithium vanadium
phosphate (Fe_{0.2}-1Li_{0.05}-1.2V_{0.8}(PO₄)) 407606-42-2, Iron lithium
molybdenum phosphate (Fe_{0.2}-1Li_{0.05}-1.2Mo_{0.8}(PO₄))
407606-44-4, Iron lithium titanium phosphate
(Fe_{0.2}-1Li_{0.05}-1.2Ti_{0.8}(PO₄)) 407606-47-7, Iron lithium zinc
phosphate (Fe_{0.2}-1Li_{0.05}-1.2Zn_{0.8}(PO₄)) 407606-49-9, Iron
lithium magnesium phosphate (Fe_{0.2}-1Li_{0.05}-1.2Mg_{0.8}(PO₄))
407606-51-3, Iron lithium niobium phosphate (Fe_{0.2}-1Li_{0.05}-1.2Nb_{0.8}-
0.8(PO₄)) 407629-87-2 407629-90-7 407629-95-2 407630-01-7
407630-10-8 407630-14-2

- (method for fabrication of **cathode** active material and nonaq. electrolyte **battery**)
- IT 15365-14-7P, Iron lithium phosphate FeLiPO_4
(method for fabrication of **cathode** active material and nonaq. electrolyte **battery**)
- IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer
(method for fabrication of **cathode** active material and nonaq. electrolyte **battery**)
- L37 ANSWER 13 OF 22 HCA COPYRIGHT 2006 ACS on STN
136:297394 Solid **electrolyte cell**. Goto, Shuji;
Hosoya, Mamoru; Endo, Takahiro (Sony Corporation, Japan). Eur. Pat. Appl. EP 1195826 A2 **20020410**, 16 pp. DESIGNATED STATES:
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123774 20011004. PRIORITY: JP 2000-306876 20001005.
- AB A solid **electrolyte cell** in which cell characteristics are not deteriorated even on overdischarge to the cell voltage of 0 V, such that the shape of the cell encapsulated in the laminate film is maintained. The cell includes a **cathode** contg. a compd. represented by the general formula $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$ where $0.05 \leq x \leq 1.2$, $0 \leq y \leq 0.8$, and M is at least one selected from the group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, an **anode** and a solid electrolyte. An **electrode** unit 1 comprised of the **cathode** and the **anode** layered together with interposition of the solid electrolyte is encapsulated with a laminate film 2.
- IT **407606-24-0**, Cobalt iron lithium phosphate ($\text{Co}_{0.2}\text{Fe}_{0.8}\text{Li}_{1.0}\text{PO}_4$) **407606-34-2**, Iron lithium manganese phosphate ($\text{Fe}_{0.2}\text{Li}_{0.8}\text{Mn}_{0.2}\text{PO}_4$) **407606-36-4**, Iron lithium nickel phosphate ($\text{Fe}_{0.2}\text{Li}_{0.8}\text{Ni}_{0.2}\text{PO}_4$) **407606-44-4**, Iron lithium titanium phosphate ($\text{Fe}_{0.2}\text{Li}_{0.8}\text{Ti}_{0.2}\text{PO}_4$) **412351-36-1**, Iron lithium manganese phosphate ($\text{Fe}_{0.9}\text{Li}_{0.1}\text{Mn}_{0.1}\text{PO}_4$)
(solid **electrolyte cell**)
- RN 407606-24-0 HCA
- CN Cobalt iron lithium phosphate ($\text{Co}_{0.2}\text{Fe}_{0.8}\text{Li}_{1.0}\text{PO}_4$) (9CI)
(CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Co	0 - 0.8	7440-48-4
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-34-2 HCA
 CN Iron lithium manganese phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Mn}_{0.8}(\text{PO}_4)$)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0 - 0.8	7439-96-5
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-36-4 HCA
 CN Iron lithium nickel phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Ni}_{0.8}(\text{PO}_4)$) (9CI)
 (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Ni	0 - 0.8	7440-02-0
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 407606-44-4 HCA
 CN Iron lithium titanium phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Ti}_{0.8}(\text{PO}_4)$)
 (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Ti	0 - 0.8	7440-32-6
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

RN 412351-36-1 HCA
 CN Iron lithium manganese phosphate ($\text{Fe}_{0.9}\text{LiMn}_{0.1}(\text{PO}_4)$) (9CI) (CA
 INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0.1	7439-96-5
Li	1	7439-93-2
Fe	0.9	7439-89-6

IT 7782-42-5, Graphite, uses
(solid **electrolyte cell**)
RN 7782-42-5 HCA
CN Graphite (8CI, 9CI) (CA INDEX NAME)

C

IC ICM H01M004-58
ICS H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST **battery** solid electrolyte
IT Polyoxyalkylenes, uses
(lithium complex; solid **electrolyte cell**)
IT **Battery cathodes**
Secondary **batteries**
(solid **electrolyte cell**)
IT Fluoropolymers, uses
(solid **electrolyte cell**)
IT 7439-93-2D, Lithium, polyethylene oxide complex 7791-03-9, Lithium perchlorate 12031-65-1, Lithium nickel oxide LiNiO_2 12057-17-9, Lithium manganese oxide LiMn_2O_4 15365-14-7, Iron lithium phosphate FeLiPO_4 25322-68-3D, Polyethylene oxide, lithium complex 116327-69-6, Cobalt lithium nickel oxide $\text{Co}_{0.1}\text{LiNi}_{0.9}\text{O}_2$ 147812-18-8, Iron lithium manganese oxide $\text{Fe}_{0.05}\text{LiMn}_{1.95}\text{O}_4$ 407606-22-8, Chromium iron lithium phosphate ($\text{Cr}_{0.05}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$) **407606-24-0**, Cobalt iron lithium phosphate ($\text{Co}_{0.05}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$) 407606-26-2, Copper iron lithium phosphate ($\text{Cu}_{0.05}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$) 407606-28-4, Aluminum iron lithium phosphate ($\text{Al}_{0.05}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$) 407606-30-8, Gallium iron lithium phosphate ($\text{Ga}_{0.05}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$) 407606-32-0, Boron iron lithium phosphate ($\text{B}_{0.05}\text{Fe}_{0.2}\text{Li}_{0.05}\text{PO}_4$) **407606-34-2**, Iron lithium manganese phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Mn}_{0.8}\text{PO}_4$) **407606-36-4**, Iron lithium nickel phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Ni}_{0.8}\text{PO}_4$) 407606-39-7, Iron lithium vanadium phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{V}_{0.8}\text{PO}_4$) 407606-42-2, Iron lithium molybdenum phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Mo}_{0.8}\text{PO}_4$) **407606-44-4**, Iron lithium titanium phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Ti}_{0.8}\text{PO}_4$) 407606-47-7, Iron lithium zinc phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Zn}_{0.8}\text{PO}_4$) 407606-49-9, Iron lithium magnesium phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Mg}_{0.8}\text{PO}_4$) 407606-51-3, Iron lithium niobium phosphate ($\text{Fe}_{0.2}\text{Li}_{0.05}\text{Nb}_{0.8}\text{PO}_4$) 408331-94-2, Cobalt lithium nickel oxide (Co,NiLiO_2) 408331-95-3, Cobalt lithium manganese oxide (Co,MnLiO_2) 408331-96-4, Cobalt lithium zinc oxide (Co,ZnLiO_2) 408331-97-5, Cobalt lithium tin oxide

((Co,Sn)LiO-2O2) 408331-99-7, Cobalt lithium vanadium oxide
 ((Co,V)LiO-2O2) 408332-00-3, Cobalt lithium titanium oxide
 ((Co,Ti)LiO-2O2) 408332-01-4, Cobalt lithium molybdenum oxide
 ((Co,Mo)LiO-2O2) 408332-02-5, Cobalt lithium tungsten oxide
 ((Co,W)LiO-2O2) 408332-03-6, Cobalt lithium magnesium oxide
 ((Co,Mg)LiO-2O2) 408332-04-7, Cobalt lithium strontium oxide
 ((Co,Sr)LiO-2O2) 408332-05-8, Cobalt lithium niobium oxide
 ((Co,Nb)LiO-2O2) 408332-06-9, Cobalt iron lithium oxide
 ((Co,Fe)LiO-2O2) 408332-07-0, Cobalt copper lithium oxide
 ((Co,Cu)LiO-2O2) 408332-08-1, Aluminum cobalt lithium oxide
 ((Al,Co)LiO-2O2) 408332-09-2, Cobalt lithium borate oxide
 (CoO-1LiO-2(BO2)O-100-2) 408332-10-5, Cobalt gallium lithium oxide
 ((Co,Ga)LiO-2O2) 408332-11-6, Chromium cobalt lithium oxide
 ((Cr,Co)LiO-2O2) 408332-12-7, Calcium cobalt lithium oxide
 ((Ca,Co)LiO-2O2) 408332-13-8, Iron lithium nickel oxide
 ((Fe,Ni)LiO-2O2) 408332-14-9, Copper lithium nickel oxide
 ((Cu,Ni)LiO-2O2) 408332-15-0, Aluminum lithium nickel oxide
 ((Al,Ni)LiO-2O2) 408332-16-1, Lithium nickel borate oxide
 (LiO-2NiO-1(BO2)O-100-2) 408332-17-2, Gallium lithium nickel oxide
 ((Ga,Ni)LiO-2O2) 408332-18-3, Chromium lithium nickel oxide
 ((Cr,Ni)LiO-2O2) 408332-19-4, Calcium lithium nickel oxide
 ((Ca,Ni)LiO-2O2) 408332-20-7, Lithium manganese nickel oxide
 (LiO-2(Mn,Ni)O2) 408332-21-8, Lithium nickel zinc oxide
 (LiO-2(Ni,Zn)O2) 408332-22-9, Lithium nickel tin oxide
 (LiO-2(Ni,Sn)O2) 408332-23-0, Lithium nickel vanadium oxide
 (LiO-2(Ni,V)O2) 408332-24-1, Lithium nickel titanium oxide
 (LiO-2(Ni,Ti)O2) 408332-25-2, Lithium nickel tungsten oxide
 (LiO-2(Ni,W)O2) 408332-26-3, Lithium molybdenum nickel oxide
 (LiO-2(Mo,Ni)O2) 408332-27-4, Lithium magnesium nickel oxide
 (LiO-2(Mg,Ni)O2) 408332-28-5, Lithium nickel strontium oxide
 (LiO-2(Ni,Sr)O2) 408332-29-6, Lithium nickel niobium oxide
 (LiO-2(Ni,Nb)O2) 408332-30-9, Lithium manganese nickel oxide
 (LiO-2(Mn,Ni)2O4) 408332-31-0, Lithium manganese zinc oxide
 (LiO-2(Mn,Zn)2O4) 408332-32-1, Lithium manganese tin oxide
 (LiO-2(Mn,Sn)2O4) 408332-33-2, Lithium manganese vanadium oxide
 (LiO-2(Mn,V)2O4) 408332-34-3, Lithium manganese titanium oxide
 (LiO-2(Mn,Ti)2O4) 408332-35-4, Lithium manganese molybdenum oxide
 (LiO-2(Mn,Mo)2O4) 408332-36-5, Lithium manganese tungsten oxide
 (LiO-2(Mn,W)2O4) 408332-37-6, Lithium magnesium manganese oxide
 (LiO-2(Mg,Mn)2O4) 408332-38-7, Lithium manganese strontium oxide
 (LiO-2(Mn,Sr)2O4) 408332-39-8, Lithium manganese niobium oxide
 (LiO-2(Mn,Nb)2O4) 408332-40-1, Iron lithium manganese oxide
 ((Fe,Mn)2LiO-2O4) 408332-42-3, Cobalt lithium manganese oxide
 ((Co,Mn)2LiO-2O4) 408332-44-5, Aluminum lithium manganese oxide
 ((Al,Mn)2LiO-2O4) 408332-45-6, Lithium manganese borate oxide
 (LiO-2MnO-2(BO2)O-200-4) 408332-46-7, Gallium lithium manganese
 oxide ((Ga,Mn)2LiO-2O4) 408332-47-8, Chromium lithium manganese
 oxide ((Cr,Mn)2LiO-2O4) 408332-48-9, Calcium lithium manganese

oxide ((Ca,Mn)₂LiO-2O₄) 408332-58-1, Aluminum cobalt lithium
nickel oxide (Al_{0.01}Co_{0.98}LiNi_{0.01}O₂) **412351-36-1**, Iron
lithium manganese phosphate (Fe_{0.9}LiMn_{0.1}(PO₄))
(solid **electrolyte cell**)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate
7782-42-5, Graphite, uses 12190-79-3, Cobalt
lithium oxide colio₂ 21324-40-3, Lithium hexafluorophosphate
24937-79-9, PvdF
(solid **electrolyte cell**)

L37 ANSWER 14 OF 22 HCA COPYRIGHT 2006 ACS on STN

136:281939 Nonaqueous electrolyte **battery cathode**
active material capable of reversibly doping/undoping lithium.
Hosoya, Mamoru; Takahashi, Kimio; Fukushima, Yuzuru (Sony
Corporation, Japan). Eur. Pat. Appl. EP 1193787 A2 **20020403**
, 16 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR,
IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English).
CODEN: EPXXDW. APPLICATION: EP 2001-123181 20010927. PRIORITY: JP
2000-301399 20000929.

AB An LiFePO₄ **carbon** composite **material** is to be
synthesized in a single phase to realize superior cell
characteristics. To this end, in the prepn. of a **cathode**
active material, starting materials for synthesis of a compd. having
the formula Li_xFePO₄, where 0 < x ≤ 1, are mixed together,
milled and sintered. A **carbon material** is added
at one of these steps. As the starting materials for synthesis for
Li_xFePO₄, Li₃PO₄, Fe₃PO₄, Fe₃(PO₄)₂ or its hydrate
Fe₃(PO₄)₂·nH₂O, where n is the no. of hydrates, are used, and
the content of Fe³⁺ in the total iron in Fe₃(PO₄)₂ or its hydrate
Fe₃(PO₄)₂·nH₂O is set to 61 wt% or less.

IT **7440-44-0**, Carbon, uses **7782-42-5**,
Graphite, uses
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)

RN 7440-44-0 HCA

CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

RN 7782-42-5 HCA

CN Graphite (8CI, 9CI) (CA INDEX NAME)

C

IT **198782-39-7P**, Iron lithium phosphate (FeLiO-1(PO₄))
(nonaq. electrolyte **battery cathode** active

material capable of reversibly doping/undoping lithium)
RN 198782-39-7 HCA
CN Iron lithium phosphate (FeLiO-1(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Li	0 - 1	7439-93-2
Fe	1	7439-89-6

IC ICM H01M004-58
ICS H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST **battery cathode** lithium iron phosphate carbon composite
IT Secondary **batteries**
(lithium; nonaq. electrolyte **battery cathode**
active material capable of reversibly doping/undoping lithium)
IT Ball milling
Battery cathodes
Composites
Sintering
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
IT **Carbonaceous** materials (technological products)
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
IT Fluoropolymers, uses
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
IT 10028-23-6, Phosphoric acid, iron(2+) salt (2:3) octahydrate
10045-86-0, Ferric phosphate 10377-52-3, Lithium phosphate li3po4
31096-55-6
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate
7439-93-2, Lithium, uses **7440-44-0**, Carbon, uses
7782-42-5, Graphite, uses 9011-17-0,
Hexafluoropropylene-vinylidene fluoride copolymer 15365-14-7, Iron
lithium phosphate FeLiPO4 21324-40-3, Lithium hexafluorophosphate
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
IT 24937-79-9, PvdF
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
IT **198782-39-7P**, Iron lithium phosphate (FeLiO-1(PO4))
(nonaq. electrolyte **battery cathode** active

- material capable of reversibly doping/undoping lithium)
IT 872-36-6, Vinylene carbonate
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
- L37 ANSWER 15 OF 22 HCA COPYRIGHT 2006 ACS on STN
136:281938 Nonaqueous electrolyte **battery cathode**
active material capable of reversibly doping/undoping lithium.
Hosoya, Mamoru; Takahashi, Kimio; Fukushima, Yuzuru (Sony
Corporation, Japan). Eur. Pat. Appl. EP 1193786 A2 **20020403**
, 15 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR,
IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English).
CODEN: EPXXDW. APPLICATION: EP 2001-123180 20010927. PRIORITY: JP
2000-301401 20000929.
- AB A LiFePO₄ **carbon** composite **material** is to be
synthesized in a single phase satisfactorily to achieve superior
cell characteristics. In prepg. a **cathode** active
material, starting materials for synthesis of a compd. represented
by the general formula Li_xFePO₄, where 0 < x ≤ 1, are mixed,
milled and a **carbon material** is added to the
resulting mass at an optional time point in the course of mixing,
milling and sintering. Li₃PO₄, Fe₃(PO₄)₂ or its hydrates
Fe₃(PO₄)₂·nH₂O, where n denotes the no. of hydrates, are used
as the starting materials for synthesis of Li_xFePO₄. The temp. of a
product from the sintering is set to 305° or less when the
product from the sintering is exposed to atm. The oxygen concn. in
a sintering atm. is set to 1012 ppm in vol. or less at the time
point of sintering.
- IT **7782-42-5, Graphite**, uses
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
- RN 7782-42-5 HCA
CN Graphite (8CI, 9CI) (CA INDEX NAME)
- C
- IT **7440-44-0, Carbon**, uses
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
- RN 7440-44-0 HCA
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)
- C
- IT **198782-39-7P, Iron lithium phosphate (FeLi₀₋₁(PO₄))**
(nonaq. electrolyte **battery cathode** active

material capable of reversibly doping/undoping lithium)
RN 198782-39-7 HCA
CN Iron lithium phosphate (FeLi0-1(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Li	0 - 1	7439-93-2
Fe	1	7439-89-6

IC ICM H01M004-58
ICS H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST **battery cathode** lithium iron phosphate carbon composite
IT Secondary **batteries**
(lithium; nonaq. electrolyte **battery cathode**
active material capable of reversibly doping/undoping lithium)
IT **Battery cathodes**
Composites
Sintering
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
IT Carbon black, uses
Carbonaceous materials (technological products)
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
IT Fluoropolymers, uses
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
IT Ball milling
(planetary; nonaq. electrolyte **battery cathode**
active material capable of reversibly doping/undoping lithium)
IT 10028-23-6, Phosphoric acid, iron(2+) salt (2:3) octahydrate
10377-52-3, Lithium phosphate 14940-41-1, Iron phosphate fe3(po4)2
31096-55-6
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate
616-38-6, Dimethyl carbonate 7439-93-2, Lithium, uses
7782-42-5, Graphite, uses 21324-40-3, Lithium
hexafluorophosphate
(nonaq. electrolyte **battery cathode** active
material capable of reversibly doping/undoping lithium)
IT 872-36-6, Vinylene carbonate **7440-44-0**, Carbon, uses
9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer
24937-79-9, Poly(vinylidene fluoride)

- (nonaq. electrolyte **battery cathode** active material capable of reversibly doping/undoping lithium)
- IT 15365-14-7P, Iron lithium phosphate felipo4 **198782-39-7P**,
Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$)
(nonaq. electrolyte **battery cathode** active material capable of reversibly doping/undoping lithium)
- IT 7782-44-7, Oxygen, uses
(nonaq. electrolyte **battery cathode** active material capable of reversibly doping/undoping lithium)
- L37 ANSWER 16 OF 22 HCA COPYRIGHT 2006 ACS on STN
136:281937 Nonaqueous electrolyte **battery** with **cathode**
active material capable of reversibly doping/undoping lithium.
Hosoya, Mamoru; Takahashi, Kimio; Fukushima, Yuzuru (Sony Corporation, Japan). Eur. Pat. Appl. EP 1193785 A2 **20020403**, 16 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-122769 20010921. PRIORITY: JP 2000-301402 20000929.
- AB A LiFePO_4 **carbon** composite **material** is to be synthesized in a single phase satisfactorily to prevent the deterioration of the performance of the **cathode** active material from occurring and achieve superior cell characteristics. In prepg. a **cathode** active material, starting materials for synthesis of a compd. represented by the general formula Li_xFePO_4 , where $0 < x \leq 1$, are mixed, milled and a **carbon material** is added to the resulting mass at an optional time point in the course of mixing, milling and sintering. Li_3PO_4 , $\text{Fe}_3(\text{PO}_4)_2$ or its hydrates $\text{Fe}_3(\text{PO}_4)_2 \cdot n\text{H}_2\text{O}$, where n denotes the no. of hydrates, are used as the starting materials for synthesis of Li_xFePO_4 . The temp. of a product from the sintering is set to 305° or less when the product from the sintering is exposed to atm.
- IT **7782-42-5, Graphite**, uses
(nonaq. electrolyte **battery** with **cathode** active material capable of reversibly doping/undoping lithium)
- RN 7782-42-5 HCA
CN Graphite (8CI, 9CI) (CA INDEX NAME)
- C
- IT **7440-44-0**, Carbon, uses
(nonaq. electrolyte **battery** with **cathode** active material capable of reversibly doping/undoping lithium)
- RN 7440-44-0 HCA
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT **198782-39-7P**, Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$)
 (nonaq. electrolyte **battery** with **cathode**
 active material capable of reversibly doping/undoping lithium)
 RN 198782-39-7 HCA
 CN Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Li	0 - 1	7439-93-2
Fe	1	7439-89-6

IC ICM H01M004-58
 ICS H01M010-40
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST **battery cathode** lithium iron phosphate carbon
 composite
 IT Secondary **batteries**
 (lithium; nonaq. electrolyte **battery** with
cathode active material capable of reversibly
 doping/undoping lithium)
 IT **Battery cathodes**
 Composites
 (nonaq. electrolyte **battery** with **cathode**
 active material capable of reversibly doping/undoping lithium)
 IT **Carbonaceous** materials (technological products)
 (nonaq. electrolyte **battery** with **cathode**
 active material capable of reversibly doping/undoping lithium)
 IT Fluoropolymers, uses
 (nonaq. electrolyte **battery** with **cathode**
 active material capable of reversibly doping/undoping lithium)
 IT Ball milling
 (planetary; nonaq. electrolyte **battery** with
cathode active material capable of reversibly
 doping/undoping lithium)
 IT 10377-52-3, Lithium phosphate Li_3PO_4 14940-41-1, Iron phosphate
 $\text{Fe}_3(\text{PO}_4)_2$ 31096-55-6
 (nonaq. electrolyte **battery** with **cathode**
 active material capable of reversibly doping/undoping lithium)
 IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate
 616-38-6, Dimethyl carbonate 872-36-6, Vinylene carbonate
 7439-93-2, Lithium, uses **7782-42-5, Graphite**,
 uses 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer
 21324-40-3, Lithium hexafluorophosphate

- (nonaq. electrolyte **battery** with **cathode**
active material capable of reversibly doping/undoping lithium)
- IT **7440-44-0**, Carbon, uses 24937-79-9, PvdF
(nonaq. electrolyte **battery** with **cathode**
active material capable of reversibly doping/undoping lithium)
- IT 15365-14-7P, Iron lithium phosphate FeLiPO_4 **198782-39-7P**,
Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$)
(nonaq. electrolyte **battery** with **cathode**
active material capable of reversibly doping/undoping lithium)
- L37 ANSWER 17 OF 22 HCA COPYRIGHT 2006 ACS on STN
136:265826 Method for the preparation of **cathode** active
material for a nonaqueous electrolyte **battery**. Hosoya,
Mamoru; Takahashi, Kimio; Fukushima, Yuzuru (Sony Corporation,
Japan). Eur. Pat. Appl. EP 1193784 A2 **20020403**, 16 pp.
DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI,
LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN:
EPXXDW. APPLICATION: EP 2001-122752 20010921. PRIORITY: JP
2000-301403 20000929.
- AB A LiFePO_4 **carbon** composite **material** is to be
synthesized in a single phase satisfactorily to achieve superior
cell characteristics. In prep. a **cathode** active
material, a starting material for synthesis of a compd. represented
by the general formula Li_xFePO_4 , where $0 < x \leq 1$, is mixed,
milled and sintered and a **carbon material** is
added to the resulting mass at an optional time point in the course
of mixing, milling and sintering. Li_3PO_4 , $\text{Fe}_3(\text{PO}_4)_2$ or its hydrates
 $\text{Fe}_3(\text{PO}_4)_2 \cdot n\text{H}_2\text{O}$, where n denotes the no. of hydrates, are used
as the starting material for synthesis of Li_xFePO_4 . The particle
size distribution of particles of the starting material for
synthesis following the milling with the particle size not less than
 $3 \mu\text{m}$ is set to 2.2% or less in terms of the volumetric
integration frequency.
- IT **7440-44-0**, Carbon, uses
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- RN 7440-44-0 HCA
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)
- C
- IT **198782-39-7P**, Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$)
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- RN 198782-39-7 HCA
CN Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O4P	1	14265-44-2
Li	0 - 1	7439-93-2
Fe	1	7439-89-6
IC	ICM H01M004-58 ICS H01M010-40	
CC	52-2 (Electrochemical, Radiational, and Thermal Energy Technology)	
ST	battery cathode lithium iron phosphate carbon composite	
IT	Secondary batteries (lithium; method for prepn. of cathode active material for nonaq. electrolyte battery)	
IT	Battery cathodes Particle size distribution (method for prepn. of cathode active material for nonaq. electrolyte battery)	
IT	Carbon black, uses (method for prepn. of cathode active material for nonaq. electrolyte battery)	
IT	Ball milling (planetary; method for prepn. of cathode active material for nonaq. electrolyte battery)	
IT	108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 21324-40-3, Lithium hexafluorophosphate (method for prepn. of cathode active material for nonaq. electrolyte battery)	
IT	7440-44-0 , Carbon, uses (method for prepn. of cathode active material for nonaq. electrolyte battery)	
IT	15365-14-7P, Iron lithium phosphate FeLiPO4 198782-39-7P , Iron lithium phosphate (FeLiO-1(PO4)) (method for prepn. of cathode active material for nonaq. electrolyte battery)	
L37	ANSWER 18 OF 22 HCA COPYRIGHT 2006 ACS on STN 136:265825 Method for the preparation of cathode active material for a nonaqueous electrolyte battery . Hosoya, Mamoru; Takahashi, Kimio; Fukushima, Yuzuru (Sony Corporation, Japan). Eur. Pat. Appl. EP 1193783 A2 20020403 , 20 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-122751 20010921. PRIORITY: JP 2000-301400 20000929.	
AB	A nonaq. electrolyte cell is disclosed having	

superior electronic cond. and superior cell characteristics. A **cathode** active material used for the cell is a composite material of a compd. having the formula Li_xFePO_4 , where $0 < x \leq 1.0$, and a **carbon material**, wherein the sp. surface area as found by the Brunauer Emmet Teller formula is not less than 10.3 m²/g.

IT **7440-44-0**, Carbon, uses
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)

RN 7440-44-0 HCA

CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT **198782-39-7P**, Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$)
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)

RN 198782-39-7 HCA

CN Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Li	0 - 1	7439-93-2
Fe	1	7439-89-6

IC ICM H01M004-58

ICS H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery** nonaq electrolyte **cathode** lithium iron
phosphate

IT Secondary **batteries**

(lithium; method for prepn. of **cathode** active material
for nonaq. electrolyte **battery**)

IT **Battery cathodes**

Surface area

(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)

IT Carbon black, uses

Carbonaceous materials (technological products)

(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)

IT Fluoropolymers, uses

(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)

IT 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate

- 7439-93-2, Lithium, uses **7440-44-0**, Carbon, uses
21324-40-3, Lithium hexafluorophosphate
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- IT 24937-79-9, PvdF
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- IT 15365-14-7P, Iron lithium phosphate FeLiPO_4 **198782-39-7P**,
Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$)
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- L37 ANSWER 19 OF 22 HCA COPYRIGHT 2006 ACS on STN
136:203096 Method for preparation of **cathode** active material
for nonaqueous electrolyte **battery**. Hosoya, Mamoru;
Takahashi, Kimio; Fukushima, Yuzuru (Sony Corporation, Japan). Eur.
Pat. Appl. EP 1184920 A2 **20020306**, 21 pp. DESIGNATED
STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,
MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW.
APPLICATION: EP 2001-120637 20010830. PRIORITY: JP 2000-261277
20000830.
- AB A **cathode** active material improved in electron cond. and a
non-aq. **electrolyte cell** employing this
cathode active material and which is improved in cell
capacity and cyclic characteristics are disclosed. The
cathode active material is composed of a compd. having the
general formula Li_xFePO_4 where $0 < x \leq 1.0$, and a
carbon material, with the **carbon** content
per unit wt. being not less than 3 wt% and with the powder d. being
not lower than 2.2 g/cm³.
- IT **198782-39-7P**, Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$)
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- RN 198782-39-7 HCA
CN Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Li	0 - 1	7439-93-2
Fe	1	7439-89-6

- IT **7440-44-0**, Carbon, uses
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- RN 7440-44-0 HCA
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

- IC ICM H01M004-58
ICS H01M004-62; H01M004-04
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST **cathode** active material prepn nonaq electrolyte
battery
- IT Secondary **batteries**
(lithium; method for prepn. of **cathode** active material
for nonaq. electrolyte **battery**)
- IT **Battery cathodes**
Sintering
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- IT **Carbonaceous** materials (technological products)
Fluoropolymers, uses
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- IT Carbon black, uses
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- IT 10045-86-0, Phosphoric acid, iron(3+) salt (1:1) 10377-52-3,
Lithium phosphate
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate
616-38-6, Dimethyl carbonate 7439-93-2, Lithium, uses
21324-40-3, Lithium hexafluorophosphate
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- IT 24937-79-9, PvdF
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- IT 15365-14-7P, Iron lithium phosphate FeLiPO_4 **198782-39-7P**,
Iron lithium phosphate ($\text{FeLiO-1(PO}_4\text{)}$)
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- IT **7440-44-0**, Carbon, uses
(method for prepn. of **cathode** active material for
nonaq. electrolyte **battery**)
- L37 ANSWER 20 OF 22 HCA COPYRIGHT 2006 ACS on STN
135:346864 **Cathode** for nonaqueous electrolyte lithium ion
battery. Yamada, Atsuo; Yamahira, Takayuki (Sony
Corporation, Japan). Eur. Pat. Appl. EP 1150368 A2 **20011031**
, 26 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR,

IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English).
 CODEN: EPXXDW. APPLICATION: EP 2001-109919 20010424. PRIORITY: JP
 2000-128998 20000425.

AB The lithium ion cell is improved appreciably in operational stability under special conditions, such as high temps., and exhibits superior characteristics against over-discharging, while guaranteeing compatibility to the operating voltage of a conventional lithium ion cell and an energy d. equiv. to that of the conventional lithium ion cell. To this end, the lithium ion cell includes a pos. **electrode**, a neg. **electrode** and a nonaq. electrolyte, and uses, as a pos. **electrode** active material, a composite material of a first lithium compd. represented by the general formula Li_xMyPO_4 , where $0 < x < 2$, $0.8 < y < 1.2$ and M contains Fe, and a second lithium compd. having a potential holder than the potential of the first lithium compd.

IT **7782-42-5, Graphite**, uses **19414-36-9**,
 Iron lithium manganese phosphate ((Fe,Mn)Li(PO4))
 (**cathode** for nonaq. electrolyte lithium ion
battery)

RN 7782-42-5 HCA

CN Graphite (8CI, 9CI) (CA INDEX NAME)

C

RN 19414-36-9 HCA

CN Iron lithium manganese phosphate ((Fe,Mn)Li(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0 - 1	7439-96-5
Li	1	7439-93-2
Fe	0 - 1	7439-89-6

IT **7440-44-0, Carbon**, uses
 (pyrocarbon; **cathode** for nonaq. electrolyte lithium ion
battery)

RN 7440-44-0 HCA

CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IC ICM H01M004-58

ICS C01G049-00; C01B025-30; C01B025-45; H01M004-38

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST lithium nonaq electrolyte **cathode**
IT Charcoal
(activated; **cathode** for nonaq. electrolyte lithium ion
battery)
IT **Battery cathodes**
(**cathode** for nonaq. electrolyte lithium ion
battery)
IT Carbon fibers, uses
Carbonaceous materials (technological products)
Coke
Petroleum coke
(**cathode** for nonaq. electrolyte lithium ion
battery)
IT Carbon black, uses
(**cathode** for nonaq. electrolyte lithium ion
battery)
IT Fluoropolymers, uses
(**cathode** for nonaq. electrolyte lithium ion
battery)
IT Organic compounds, uses
(high mol., sintered; **cathode** for nonaq. electrolyte
lithium ion **battery**)
IT Secondary **batteries**
(lithium; **cathode** for nonaq. electrolyte lithium ion
battery)
IT Coke
(needle; **cathode** for nonaq. electrolyte lithium ion
battery)
IT Coke
(pitch; **cathode** for nonaq. electrolyte lithium ion
battery)
IT Furan resins
Phenolic resins, uses
(sintered and carbonized; **cathode** for nonaq.
electrolyte lithium ion **battery**)
IT 50-21-5D, Lactic acid, ester 60-29-7, Diethyl ether, uses
64-19-7D, Acetic acid, ester, uses 75-05-8, Acetonitrile, uses
79-09-4D, Propionic acid, ester 96-47-9, 2-Methyltetrahydrofuran
96-48-0 96-49-1, Ethylene carbonate 100-66-3, Anisole, uses
105-58-8, Diethyl carbonate 107-12-0, Propionitrile 108-32-7,
Propylene carbonate 109-99-9, Thf, uses 110-71-4,
1,2-Dimethoxyethane 126-33-0, Sulfolane 409-21-2, Silicon
carbide sic, uses 554-12-1, Methyl propionate 616-38-6, Dimethyl
carbonate 623-42-7, Methyl butyrate 623-96-1, Dipropyl carbonate
629-14-1, 1,2-Diethoxyethane 646-06-0, 1,3-Dioxolane 872-36-6,
Vinylene carbonate 1072-47-5, 4-Methyl-1,3-dioxolane 1313-08-2
2550-62-1, Lithium methanesulfonate 4437-85-8, Butylene carbonate

7439-93-2, Lithium, uses 7440-50-8, Copper, uses 7447-41-8,
Lithium chloride, uses 7550-35-8, Lithium bromide
7782-42-5, Graphite, uses 7791-03-9, Lithium
perchlorate 9003-07-0, Polypropylene 12007-81-7, Silicon
tetraboride 12008-29-6, Silicon hexaboride 12013-56-8, Calcium
disilicide 12017-12-8, Cobalt disilicide 12018-09-6, Chromium
disilicide 12022-99-0, Iron disilicide 12032-86-9, Manganese
disilicide 12033-76-0, Silicon nitride oxide Si₂N₂O 12033-89-5,
Silicon nitride, uses 12034-80-9, Niobium disilicide 12039-79-1,
Tantalum disilicide 12039-83-7, Titanium silicide TiSi₂
12039-87-1, Vanadium disilicide 12039-88-2, Tungsten disilicide
12059-14-2, Nickel silicide (Ni₂Si) 12136-78-6, Molybdenum
disilicide 12159-07-8, Copper silicide Cu₅Si 12190-79-3, Cobalt
lithium oxide CoLiO₂ 12201-89-7, Nickel disilicide 14283-07-9,
Lithium tetrafluoroborate 14485-20-2, Lithium tetraphenylborate
15365-14-7, Iron lithium phosphate FeLiPO₄ **19414-36-9**,
Iron lithium manganese phosphate ((Fe,Mn)Li(PO₄)) 21324-40-3,
Lithium hexafluorophosphate 22831-39-6, Magnesium silicide (Mg₂Si)
29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium
trifluoromethanesulfonate 35678-71-8, Methylsulfolane 90076-65-6
113066-89-0, Cobalt lithium nickel oxide Co_{0.2}LiNi_{0.8}O₂
113671-38-8, Silicon oxide SiO₂ 160479-36-7, Lithium tin oxide
178958-56-0, Lithium silicon oxide 300858-61-1 339333-78-7, Zinc
silicide ZnSi₂ 371148-86-6, Tin oxide (SnO₂) 371148-87-7,
Lithium magnesium manganese oxide (LiMg_{0.2}Mn_{0.8}O₂)

(**cathode** for nonaq. electrolyte lithium ion
battery)

IT 24937-79-9, PvdF

(**cathode** for nonaq. electrolyte lithium ion
battery)

IT **7440-44-0**, Carbon, uses

(pyrocarbon; **cathode** for nonaq. electrolyte lithium ion
battery)

L37 ANSWER 21 OF 22 HCA COPYRIGHT 2006 ACS on STN

130:314395 New lithium insertion **electrode** materials based on
tetraoxyanions derivatives with olivine structure. Simoneau,
Martin; Armand, Michel; Choquette, Yves; Zaghib, Karim
(Hydro-Quebec, Can.). Can. Pat. Appl. CA 2200998 AA
19980925, 5 pp. (English). CODEN: CPXXEB. APPLICATION: CA
1997-2200998 19970325.

AB A lithium insertion-type pos. **electrode** materials having
an olivine structure based on iron or manganese derivs., whose
general formula is: Li_x-yM₁-(y+d+t+q+r)DdTtQqRr[PO₄]₁-
(p+s+v)[SO₄]_p[SiO₄]_s[VO₄]_v where: M represents Fe²⁺ or Mn²⁺ or
mixts. thereof; D represents a metal in the +2 oxidn. state, chosen
among: Mg²⁺, Ni²⁺, Co²⁺, Zn²⁺, Cu²⁺, Ti²⁺; T represents a metal in
the +3 oxidn. state, chosen among: Al³⁺, Ti³⁺, Cr³⁺, Fe³⁺, Mn³⁺,

Ga³⁺, Zn²⁺, V³⁺; Q represents a metal in the +4 oxidn. state, chosen among: Ti⁴⁺, Ge⁴⁺, Sn⁴⁺, V⁴⁺. R represents a metal in the +5 oxidn. state, chosen among: V⁵⁺, Nb⁵⁺, Ta⁵⁺. All M, D, T, Q, R, are elements residing in octahedral sites; v is the stoichiometric coeff. for V⁵⁺ residing in tetrahedral sites. The stoichiometric coeffs. x, y, d, t, q, r, p, s, v are all comprised between zero and one with at least one among of the y, d, t, q, r, p, s and v coeffs. differing from zero. Other conditions are: $0 \leq x \leq 1$, $yr + d + t + q + r \leq 1$, $p + s + v \leq 1$, $3 + s - p = x - y + t + 2q + 3r$ where x is the degree of intercalation during operation of the **electrode** material.

IT **7440-44-0**, Carbon, uses
 (**cathode** additive; lithium insertion **electrode**
 materials based on tetraoxyanions derivs. with olivine structure)
 RN 7440-44-0 HCA
 CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT **223505-09-7**, Iron lithium titanium phosphate
 (lithium insertion **electrode** materials based on
 tetraoxyanions derivs. with olivine structure)
 RN 223505-09-7 HCA
 CN Iron lithium titanium phosphate (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	x	14265-44-2
Ti	x	7440-32-6
Li	x	7439-93-2
Fe	x	7439-89-6

IC ICM H01M004-24
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST **battery** lithium insertion **electrode** olivine
 structure
 IT Fluoropolymers, uses
 Polyethers, uses
 (binder; lithium insertion **electrode** materials based on
 tetraoxyanions derivs. with olivine structure)
 IT Intercalation
 (electrochem.; lithium insertion **electrode** materials
 based on tetraoxyanions derivs. with olivine structure)
 IT **Battery anodes**
 Battery cathodes
 (lithium insertion **electrode** materials based on

- tetraoxyanions derivs. with olivine structure)
- IT Fluoropolymers, uses
Polyesters, uses
(lithium insertion **electrode** materials based on tetraoxyanions derivs. with olivine structure)
- IT Secondary **batteries**
(lithium; lithium insertion **electrode** materials based on tetraoxyanions derivs. with olivine structure)
- IT Lithium alloy
(lithium insertion **electrode** materials based on tetraoxyanions derivs. with olivine structure)
- IT 9002-84-0, Ptfе 9011-14-7, Polymethylmethacrylate 25014-41-9, Polyacrylonitrile 25104-32-9, CyclopentaDiene-Ethylene-propylene copolymer
(binder; lithium insertion **electrode** materials based on tetraoxyanions derivs. with olivine structure)
- IT **7440-44-0**, Carbon, uses
(**cathode** additive; lithium insertion **electrode** materials based on tetraoxyanions derivs. with olivine structure)
- IT 11099-11-9, Vanadium oxide 36058-25-0, Lithium iron phosphate $\text{Li}_3\text{Fe}_2(\text{PO}_4)_3$ 39302-37-9, Lithium titanium oxide 39448-96-9, **Graphite** lithium **223505-09-7**, Iron lithium titanium phosphate
(lithium insertion **electrode** materials based on tetraoxyanions derivs. with olivine structure)
- IT 7439-93-2, Lithium, uses
(lithium insertion **electrode** materials based on tetraoxyanions derivs. with olivine structure)
- IT 96-48-0, γ -Butyrolactone 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 107-21-1D, Monoethylene glycol, dialkyl ether 108-32-7, Propylene carbonate 111-46-6D, Diethylene glycol, dialkyl ether 112-27-6D, Triethylene glycol, dialkyl ether 112-60-7D, Tetraethylene glycol, dialkyl ether 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 7803-58-9D, Sulfamide, tetraalkyl deriv. 24937-79-9, Polyvinylidene fluoride
(lithium insertion **electrode** materials based on tetraoxyanions derivs. with olivine structure)
- L37 ANSWER 22 OF 22 HCA COPYRIGHT 2006 ACS on STN
130:170706 Lithium mixed oxide **cathode** active materials, **cathodes** using the materials, and lithium **batteries** using them. Amine, Khalil (Japan Storage Battery Co., Ltd., Japan).
Jpn. Kokai Tokyo Koho JP 11025983 A2 **19990129** Heisei, 22 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1997-215424 19970704.
- AB The active materials comprise $\text{LiM}_1\text{1-xM}_2\text{xPO}_4$ ($\text{M}_1 = \text{Co, Ni, Mn}$; $\text{M}_2 = \text{Mg, Fe, Ni, Co, Mn, Zn, Ge, Cu, Cr}$; $x = 0-0.5$) having the olivine

structure. The materials, which may have a rhombic structure, may be (1) LiMnPO_4 with lattice parameters of $a = 6.11 \pm 0.50 \text{ \AA}$, $b = 10.46 \pm 0.50 \text{ \AA}$, and $c = 4.73 \pm 0.50 \text{ \AA}$, (2) LiNiPO_4 with lattice parameters of $a = 5.86 \pm 0.50 \text{ \AA}$, $b = 10.07 \pm 0.20 \text{ \AA}$, $c = 4.68 \pm 0.50 \text{ \AA}$, or (3) LiCoPO_4 having lattice parameters of $a = 5.92 \pm 0.50 \text{ \AA}$, $b = 10.21 \pm 0.50 \text{ \AA}$, and $c = 4.70 \pm 0.50 \text{ \AA}$. **Cathodes** using the materials and **batteries** using the **cathodes**, electrolyte solns., and **anode** active materials contg. Li, Li alloys, Li_xSnO_2 , and **C materials** are also claimed. Li **batteries** with high energy d. and high voltage are obtained.

IT **220334-05-4P**, Iron lithium manganese phosphate ($\text{FeO}-0.5\text{LiMnO}_5-1(\text{PO}_4)$) **220334-09-8P**, Iron lithium nickel phosphate ($\text{FeO}-0.5\text{LiNiO}_5-1(\text{PO}_4)$)
(Li mixed oxides of olivine structure as **cathode** active materials for high-energy-d. and high-voltage Li **batteries**)

RN 220334-05-4 HCA

CN Iron lithium manganese phosphate ($\text{FeO}-0.5\text{LiMnO}_5-1(\text{PO}_4)$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Mn	0.5 - 1	7439-96-5
Li	1	7439-93-2
Fe	0 - 0.5	7439-89-6

RN 220334-09-8 HCA

CN Iron lithium nickel phosphate ($\text{FeO}-0.5\text{LiNiO}_5-1(\text{PO}_4)$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O4P	1	14265-44-2
Ni	0.5 - 1	7440-02-0
Li	1	7439-93-2
Fe	0 - 0.5	7439-89-6

IT **7440-44-0**, Carbon, uses
(**anode**; Li mixed oxides of olivine structure as **cathode** active materials for high-energy-d. and high-voltage Li **batteries**)

RN 7440-44-0 HCA

CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

- IC ICM H01M004-58
- ICS C01B025-45; H01M004-02; H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 75
- ST olivine lithium phosphorus oxide **cathode battery**
- IT **Battery anodes**
 - Battery cathodes**
 - Battery electrolytes**
 - (Li mixed oxides of olivine structure as **cathode** active materials for high-energy-d. and high-voltage Li **batteries**)
- IT Oxides (inorganic), uses
 - (Li mixed oxides of olivine structure as **cathode** active materials for high-energy-d. and high-voltage Li **batteries**)
- IT Secondary **batteries**
 - (lithium; Li mixed oxides of olivine structure as **cathode** active materials for high-energy-d. and high-voltage Li **batteries**)
- IT Crystal structure types
 - (rhombic; Li mixed oxides of olivine structure as **cathode** active materials for high-energy-d. and high-voltage Li **batteries**)
- IT Lithium alloy
 - (**anode**; Li mixed oxides of olivine structure as **cathode** active materials for high-energy-d. and high-voltage Li **batteries**)
- IT 13824-63-0P 13826-59-0P, Lithium manganese phosphate (LiMnPO_4)
13977-83-8P, Lithium nickel phosphate (LiNiPO_4) 220333-99-3P,
Lithium magnesium manganese phosphate ($\text{LiMgO-0.5Mn0.5-1(PO}_4\text{)}$)
220334-01-0P, Lithium manganese nickel phosphate
($\text{LiMn0.5-1Ni0-0.5(PO}_4\text{)}$) 220334-04-3P, Cobalt lithium manganese
phosphate ($\text{CoO-0.5LiMn0.5-1(PO}_4\text{)}$) **220334-05-4P**, Iron
lithium manganese phosphate ($\text{FeO-0.5LiMn0.5-1(PO}_4\text{)}$) 220334-06-5P,
Lithium magnesium nickel phosphate ($\text{LiMgO-0.5Ni0.5-1(PO}_4\text{)}$)
220334-07-6P, Lithium manganese nickel phosphate
($\text{LiMn0-0.5Ni0.5-1(PO}_4\text{)}$) 220334-08-7P, Cobalt lithium nickel
phosphate ($\text{CoO-0.5LiNi0.5-1(PO}_4\text{)}$) **220334-09-8P**, Iron
lithium nickel phosphate ($\text{FeO-0.5LiNi0.5-1(PO}_4\text{)}$)
(Li mixed oxides of olivine structure as **cathode** active materials for high-energy-d. and high-voltage Li **batteries**)
- IT 7439-93-2, Lithium, uses **7440-44-0**, Carbon, uses
160479-36-7, Lithium tin oxide

(**anode**; Li mixed oxides of olivine structure as
cathode active materials for high-energy-d. and
high-voltage Li **batteries**)

IT 21324-40-3, Lithium phosphorus fluoride (LiPF₆)
(electrolyte; Li mixed oxides of olivine structure as
cathode active materials for high-energy-d. and
high-voltage Li **batteries**)

IT 7440-47-3, Chromium, uses 7440-50-8, Copper, uses 7440-56-4,
Germanium, uses 7440-66-6, Zinc, uses
(mixed oxides contg.; Li mixed oxides of olivine structure as
cathode active materials for high-energy-d. and
high-voltage Li **batteries**)